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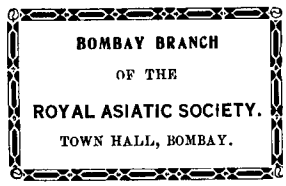

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THE

CHITTAGONG HILL-TRIBES

RESULTS

OF A JOURNEY MADE IN THE YEAR 1882

BY

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TO HER IMPERIAL AND ROYAL HIGHNESS

THE

CROWN PRINCESS OF THE GERMAN EMPIRE, AND OF PRUSSIA

HUMBLY DEDICATED

BY THE AUTHOR.

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PREFACE.

It need scarcely be said that in the work herewith committed to the kind consideration of the public I have attempted nothing more than a bird's-eye-view, so to say, of the highly interesting land and people visited by me. It has been my desire here to reproduce the personal impressions alone made on me by the country and its inhabitants. An exhaustive treatise would have needed a longer residence in Chittagong, from which I was prevented by illness and the approaching rainy season.

Hence I have foregone the cheap reputation, that might be earned by lending a deceptive appearance of finish to my work by a more detailed treatment of the social and cultured relations of the district and highlands of Chittagong, which have been so amply described in the excellent writings of Lewin and Hunter. Still the sketches of the hill-tribes, their dwellings and products here for the first time reproduced from photographs, will doubtless be acceptable to the ethnologist. Future travellers in Chittagong may also take a few useful hints on the proper period and equipment of their expeditions from the perils encountered by me.

Here also I feel it incumbent on me to openly express my heartfuelt thanks to Herr Bastian, at whose instance the trip was undertaken, and also to Herren v. Danckelman, Grünwedel, Kühn and Virchow for their aid in the preparation of this work.

Dr Riebeck's
JOURNEY TO CHITTAGONG.

Scale 1:400,000.
(6.312 Engl. miles to the inch.)

English Statute Miles (68.7 = 1°)

Kilometer (111.3 = 1°)

Dr Riebeck's Route.

British Frontier.

Lith. W. Greve, Berlin.

SUMMARY NOTICE OF THE HILL TRIBES.

Apart from the Bengali immigration into British territory, the population of the Chittagong, Noâkhâlî, Tipperah and Hill-Tipperah Districts, all dependent on the Bengal Presidency, comprises diverse tribes of Lohitic descent, including the Arakanese. The attempt to classify these peoples is rendered very difficult both by the constant immigration of little known tribes, and by the circumstance that immigrant clans became assimilated in usages and even in speech to their new neighbours. The hitherto current distribution into River and Hill peoples, a distribution originating with the Arakanese, the most cultured of the "wild tribes", not only supplies a good outward distinction, but is moreover fully justified, in as much as it at the same time preserves intact the division according to descent. The Hill Tribes may accordingly be grouped in two main divisions:

A. The *Khyoung-thâ*, or "Children of the River", that is, those settled along the river valleys, and

B. The *Toung-thâ*, or "Hill Children", whose villages are scattered over the uplands.

The *Khyoung-thâs* proper (variant forms, Choung-thâ, Chyoung-thâ, Kheong-thâ) are Maghs (Mug, Mugh), as they are erroneously named, or Murma (that is Myammâ, or Barmese), as they call themselves, immigrants from Barma (Arakan). Their speech is an Arakanese dialect differing in pronunciation alone from the Barmese, with which it agrees in its orthography. They are the only group among the Hill Tribes possessing a written language. The statements found in Dalton regarding their physical qualities are declared by Dr. Riebeck to need much emendation. Thus the assertion that their outward appearance recalls the Chinese is false. "The Maghs give on the contrary altogether the impression of Barmese or Siamese, the cheek-bones being less developed, the eyes less oblique than those of the Chinese. Dalton's statements that they have the complexion of mulattoes, are enduring, muscular and athletic, are in fact far more applicable to any other Hill Tribe, and especially to the Lushais, than to the Maghs. Their colour is a dirty yellow, the quince yellow of the Barmese, so that there can be no question of a Mulatto hue (see the table of colours). They are the feeblest of all the inhabitants of the Chittagong District, and their passion for spirits gives them a broken down look." (Verbal communication.)

The hair of both sexes is very beautiful and glossy black, and all alike pride themselves on the finest possible growth of hair. In the Chittagong District dwell rather more than 20,000 members of this tribe, here occupying the banks of the Karnaphulî and Sangu rivers.

The *Chakmâs* (Chukmâ, Tsakmâ) do not certainly speak Arakanese as their mother-tongue, as do the Maghs, although this idiom is making way amongst them; still they may be grouped with the Khyoung-thâs, as they reside along the river courses. They have a legend pointing to Chaipango or Champanâgar in India as their home. But their outward appearance is described as unlike that of the Hindus of the North-Western Provinces, their features betraying not Aryan but "Mongolic"[1]) descent. "The Chakmâs", says Dr. Riebeck, "are a mixed race mainly Bengali in aspect, while the chiefs are decidedly sprung from Kshatrya families. They are an intelligent people, bestowing extraordinary care on their fine bamboo houses, which are built with great solidity. This feature clearly distinguishes them from the

[1]) The value of the term "Mongolic" is well enough understood, and whoever has seen a Mongolian by the side of a Chinese knows what little significance it has even for the very peoples for whom it has been specially invented. It has the further drawback that members of the Tungus race thus become grouped together with East Asiatics, Lohitas, Tibetans and Indo-Chinese, so that within the latter individual distinctions become impossible.

restless Tipperahs, who are continually on the move. The Chakmâ implements are the best I have seen among the clans of the Chittagong and Hill Districts." (Verbal communication). A sub-division of this tribe are the *Toungjinyas* (Toungjynya) numbering some 2500 souls.

Their language is a mixture of Bengali, and Arakanese (gradually getting the upper hand), with a third unknown element, some specimens of which are given by Lewin (Wild Races pp. 167, 168), and which obviously represents all that survives of their original speech.

The *Toung-thâs*, with whom all other tribes are grouped, fall into two divisons — those subject or tributary to the British government, and the independent clans.

To the first belong the Tipperahs, of whom 15,000 reside in the Hill Districts. Their speech, allied to that of the Kumis, is unwritten. They are a restless, wandering people, continually shifting the site of their villages. Their habits are rude, and they readily assume a hostile attitude towards strangers. Dr. Riebeck himself was attacked by some of them armed with spears. Individual clans have become largely assimilated in usages to the Khyoung-thâs, and even to the Bengalese, while the Riângs, the wildest of all, differ little from the Lushais. Akin to the Tipperahs are the Mrungs (Mron) of Arakan, and this very name is applied by the Arakanese (Maghs) to the whole race, instead of the term Tipperah (Tripurâh), which is of Bengali or Sanskrit origin.

The *Kumis* (Kamee, Khamie, Quaymee, Kumee, Khweymi) are an interesting group, of whom scarcely more than 500 souls dwell in the Chittagong Districts. They are allied to the Karêns of Further India, as is evident from their language. Their "Mongolic" descent is clearly shown by their physical features — thick cheek-bones, small slant-eyes, flat nose and broad face. They usually present the appearance of a well-built and gifted people, and Dr. Riebeck tells us that they were his "most skilful and enduring coolies." Tattooing is unknown to them, as to all the Hill Tribes except the Khyengs. According to Dalton the Kumi and Kami differ from each other, while traits are found in common with the Shindus or Poii mentioned further on.

The whole Kumi race is estimated at 12,000 souls grouped in 27 clans. Like most Hill Tribes they have few women, and like the Tipperahs they are regarded as a restless, turbulent people.

The *Mros*, who formerly occupied the Arakan uplands, now reside mainly west of the Sangu river, and on the Mâtâmurî within the Chittagong District. According to their own account they have been driven forward by the Kumis. Anyhow it seems evident that the clans living in the Chittagong District, numbering rather more than 2000 souls, are identical with the Mrû people, who were driven out of Arakan, and whose very name has passed over to some of the Kumi clans. This name of Mro (Mrû) simply means "clan", "tribe", and like the word Kumi ("man") is current amongst both the last mentioned and the Shindus.

The Mros expelled from Arakan are said to be a robust people, strongly built, but lacking the "Mongolic" type. They are a peaceful timid race, in their quarrels never coming to blows.

Very different, however, is Dr. Riebeck's account: "The Mros are energetic, restless, wild, closely related to the Kumis and distinctly stamped with the Mongolic type".

It is obvious that this refers to the Kumi clan called Mro, a name perhaps taken from the conquered race.

The *Khyengs* (Khyang, Khyen, Chin) are far from numerous in the Chittagong District. They are allied to the Ka-Khyens, a large and wide-spread people in the kingdom of Barma. Traditionally also they came originally from the south, having branched off from the great mass of the "Shan Highlanders" in Barma. And although the speech of the few settled in the Chittagong Districts is said to approach that of the Lushais (a point however by no means evident from the scanty lists of published words), still they differ altogether in habits from the Lushais. Their outward appearance and usages are absolutely those of primeval men, going almost naked, passionately fond of the chase, armed with the bow and arrow, and practising tattooing. In the Chittagong District they are universally hated by the other tribes. Their nearest kinsmen are the Khyengs (Chin) of the river Lé-myo (Lemroo) in Arakan, and one of their branches are the Kû (Koo).

The Khyengs in British territory are said to differ but little in customs from the Mros.

The last and most important group of Hill-Tribes are the closely related Banjogi, Pankhos and Lushais, with the more remote and still little known Shindus.

The *Banjogi* (Banjogee, Bunjogee) and *Pankhos*, whose speech is closely akin to the Dzo, or Lushai language, bear also an outward resemblance to the members of that tribe. They claim, however, to be descended from the great Shan nation in Barma, tracing their origin from the south, „assumptions which to me seem fully justified" (Dr. Riebeck).

In many of their usages they also differ from the Lushais. But they are not a numerous people. Two brothers pass as the progenitors of the Banjogi and Pankhos, who in fact are closely allied in speech and customs, the only outward distinction being the style of dressing the hair.

Independent of the British rule are the following tribes.

The *Lushais* (Lushei, Lhoosai) or *Kukis* (Kookie), or, to speak more accurately, the Lushais, a sub-group of the Kukis, "are a powerful independent nation split up into numerous clans. They lie on the borders of the Chittagong Hill-Tracts, and often enough cross the frontier. Their numerous hordes stretch away to the North and South-east, on one side as far as Kachar, on the other quite to the borders of the Kingdom of Barma. But they cannot be regarded as a compact body, possessing neither a common administration nor any political centre, although all speak the same language with considerable uniformity, and practise the same usages." Three chief clans are known: The *Haulongs* (Houlong), 12,600 souls; the *Syhus*, 10,800, and the *Rattan-Puyas*,[1]) 2580. But besides these there must be many others still unrecorded. Their speech is closely akin to that of the Banjogi and Pankhos, and more remotely to that of the Shindus. It is noteworthy that the numeral for "ten", whence are also derived the tens, that for a hundred and many others agree with the Tibetan. Unfortunately these Tibetan analogies crop up in a somewhat divergent form, so that the materials to be derived from the Lushai alone for the comparative study of "Transgangetic" phonetics can scarcely yield much results. Thus we often hear it stated that the Banjogi and Pankhos resemble the Shans in appearance, the Lushais in speech, and that on the other hand close linguistic relations exist between some Shindu tribes and the great Kuki nation, of whom the Lushais are a mere section, while from the available vocabularies grounds might be advanced for a closer affinity with the Kumis and Mros. But all this merely shows how infinitely difficult it is to follow the separate development of small ethnical groups originally possessing a common fundamental speech, and to explain their diverse ramifications, crossings and natural borrowings.[2])

The various Kuki clans differ greatly from each other. Thus Woodthorpe[3]) finds much discrepancy between the Lushais of Mynadhur and those of the Chittagong Districts, and again elsewhere among the Kukis of South Manipur. "Both men and women", says the same eye-witness, "are well made and very muscular; the average height of the former appeared to be about five feet six inches, and the women, five feet four inches. The men are all sturdy fellows, thickset as to the neck and shoulders, body light and active, arms and legs muscular and well developed, their arms generally long in proportion to their bodies. Their complexion comprises every shade of brown, and their features vary considerably; the generality however possessing flat retroussé noses with wide nostrils, thick lips, and small almond-shaped eyes. Among the Lushais though, and especially among those related to the reigning families, some of whom were even handsome, we met with a much more refined type — the nose being thin and aquiline, with small nostrils, the lips thin and the mouth small. In all, however, the cheek-bones were high and prominent, the face broad and remarkable for an almost entire absence of beard or moustache; even a slight moustache and small tuft of hair on the chin being the exception rather than the rule. The expression of many was bright and intelligent".[4])

So Woodthorpe describes the Kukis of the Mynadhur country. On the Lushais seen by him in the Chittagong Districts Dr. Riebeck reports as under: "What Woodthorpe states regarding the bodily constitution of the Kukis may also be taken as applicable to the Lushais of the Chittagong region, but with certain exceptions. The great length of the arms in proportion to the body is a point that must at once strike every body. Although the calves are little developed, the legs are very sinewy. The mean size is perhaps still given somewhat too high. It is true, that the faces differ greatly; nevertheless the Lushai can be at once distinguished from the members of any other tribe. There were many handsome

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[1]) This name must after all surely be identical with the word Poii, which indicates the Shindu tribes.

[2]) For this our materials are too scanty. For Lushai alone we possess a somewhat copious work, limited however to mere lists of words, so that further researches must be awaited in this field, which is so interesting for all the Transgangetic peoples. From Lewin's exercises I append the numerals 1—10 with the corresponding Tibetan words: 1 pa-kat, Tib. gčig; 2 pa-hnít, T. gñis; 3 pa-túm, T. gsum; 4 pa-lí, T. bzi; 5 pa-nga, T. lnga; 6 pa-rúk, T. drug; 7 pa-sarí, T. bdun; 8 pa-ríek, T. brgyad; 9 pa-koa, T. dgu; 10 chom, T. bču. Examples of numeral compounds are: 14 chom-ley-pa-li, T. bču-bži; 40 chom-li, T. bži-bču. A hundred is ya, T. brgya; a thousand chang, T. stong(?). The Lushai, Banjogi and Pankho numerals take a prefix pa-, replaced in Shindu by mey-. The numerals of the other non-Arakanese clans are also closely related, but take other prefixes and are very irregularly formed. See Lewin, The Hill-Tracts of Chittagong, Calcutta 1869, p. 149. The subjoined formations in the Dzo language are also worthey of mention, being strictly analogous to the corresponding Tibetan forms. The imperative, usually formed by a suffix rok (drok), answering to the Tibetan čig, loses all suffixes in the negative, being rendered by the bare root, as is also the case in Tibetan. A suffixed root -ey seems to have functions resembling those of the Tib. 'o; and an interrogative particle em has its counterpart in Tib. 'am. The words -pa and -nu used as suffixes distinguish masculine and feminine, but are not nearly so common as the corresponding Tibetan -pa (-po), -ma (-mo). There moreover appear some very interresting relations with the Rong language.

[3]) The Lushai Expedition p. 93.

[4]) Woodthorpe p. 72—3.

faces, of course chiefly among the young, and amongst the women a certain charm was not rare. The women are usually much smaller than the men, the stature being formally compressed downwards. Shoulders and breast are firm and well developed, but the figure is short and the feet often distorted, which must perhaps be attributed to the circumstance that the women bear heavy loads in baskets on their backs.[1]) The statement regarding the complexion may be taken as correct". (Verbal communication.)

The Lushais are unruly neighbours of the British domain, and constant feuds are kept up between them and the Shindus.

A branch of the Lushais are the Shos (Chaws), frequently mentioned in earlier reports.

The *Shindus* (Shandoo, Shendoo), or Poii (Poee, Poy) were unknown before the year 1870. Their constant warfare with the Kukis, who are being steadily driven forward by them, led to the expedition of 1870, in which short campaign they were first brought under notice. Lewin, who had to run the greatest risks in their territory, has done good service in enlarging our knowledge of this brave and turbulent tribe. It holds the north-east and east sections of the "Blue" Mountains. According to Hughes their customs have little in common with those of the Kumi; yet certain relations seem to exist between them, the very tribal names of Kumi and Mro recurring also amongst the Shindus. Lewin and Woodthorpe, with whom Dr. Riebeck agrees, describe them as slimmer, taller and more delicately shaped than the great mass of the Hill-men (that is, of the Kuki and Lushais), and from what is known of their weaving, weapons &c, they appear to be very civilised. They are outwardly distinguished from the Kuki by their coiffure, while their speech, as far as can be judged from the scant list of numerals, pronouns &c, shows affinity with the Dzo, but also contains much which recalls that of the Kumi. Their costume is rich, extremely becoming and marked by a happy combination of colours.

A few words remain to be said regarding the members of those tribes, which through the spread of Islâm, and later through the British occupation, have entered the Hill Districts and the valleys of the rivers Karnaphuli, Sangu and Phenî.

The Bengalese, mainly immigrants from East Bengal and mostly Sunnite Muhammadans, are according to Hunter (Account p. 133 et seq.) very numerous, and have settled down as agriculturists, the rich as zamindars, the poor as day labourers. The Hindu Bengalese are mainly Vaishnava (followers of the various Vishnu sects), and comprise a large number of the most diverse castes, which, as in the home country, represent the most varied branches of industry, but are especially traders. (See details in Hunter p. 145 et seq.)

Since 1872 a small Goorkha community has been settled in the Hill Districts. These Goorkhas came together on the Nepalese frontier and occupied jungle tracts, which they themselves rendered arable. Another settlement was formed from the ranks of the Goorkha troops, from whom the frontier guard is mainly recruited. The Goorkhas[2]) are sprung of a mixed race in Nepâl, formed by the fusion of the Kshatrya caste with the indigenous element. They are a small people of dark complexion with coarse black hair and a more or less Mongolic type together with marked Hindu features, all remarkably skilful and active. As soldiers once dreaded opponents of the British, they have now become valued allies, who in the last Afghan war maintained their old reputation. Famous is the Kukri or national weapon.[3])

The *Manipuri*, who are also represented in the ranks of the frontier troops, descend from half-caste Kukis and Hindu settlers, a connection clearly indicated by their speech and physical peculiarities. They have been largely assimilated to the Hindus, and the Hindu pantheon, the Mahâbhârata legend, is universally current in the country. The Manipuri are distinguished by their refined and cultured bearing. A like reputation is enjoyed by the Assamese in the Chittagong District, and among the frontier troops of the northern borderlands. They also are a mixture of Aryan settlers with the native tribes of the Ahoms, Chutias and others allied to the Shan populations of Barma. (See Dalton's Ethnology of Bengal, p. 48 et seq.)

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[1]) See Plate 3, Fig. 4.

[2]) The word is derived from the Sanskrit go (ox) and rasksh (to herd), and in the Prakrit would become gorakkha, hence means herdsman. The name however, has been referred to the Indian city of Gorakhpur, in which case it would be older than the settlement of the Hindus, who in Nepâl originally occupied the territory between the Triçulagangâ and Gandâkî rivers. From the middle of the last century they have played a prominent part in the history of India, and especially of Tibet.

[3]) See Wood, History of Man, Vol. II, p. 759 et seq.

A. Grünwedel.

ANTHROPOLOGICAL REMARKS

by RUDOLF VIRCHOW.

On the physical anthropology of south-east India nothing but the most general statements has hitherto been published. The osteological material so far received in Europe is limited to two Lushai skulls. Hence all praise is due to Dr. Riebeck for his efforts to procure at least a few individual determinations, especially measurements, amongst all the Chittagong tribes with whom he came in contact. The results of measurements are brought together in a table herewith subjoined. From the numbers of the direct measurements a series of proportional numbers has then been calculated on my specifications, and appended in a second table.

Unfortunately only a very limited number of measurements could be obtained from members of the same tribe. As a rule three persons, and these men, were measured, the measurement of four, amongst them a woman, having been taken in the case of the Mros alone. On the other hand of the Shos and Manipuri we have two only, men in each case. Under these circumstances I feel the attempt must be given up to strike an average for each tribe, the number of individual measurements being too small, and the discrepancies within the several groups being too great for such a purpose. When, for instance, of three Pankho men and also of three Mro men one is found to be dolicho-, another meso-, and the third brachycephalic, no conclusion at all can be drawn from the middle term.

Nevertheless a not to be despised appreciation may even be afforded by isolated cases, especially if adapted to the method of group formations. But for the future must naturally be reserved such rectifications as may be needed by the acquisition of fresh materials. Meanwhile it seems to me that without overstraining the following inferences may still be warranted.

In the groupings we have in the first place to consider the relation of the individuals to the various tribes. Those disposed under Nos 34—44, members of the traveller's military escort, come from other regions of India; hence can only be considered in a supplimentary way. All the others may be grouped in two main divisions, in accordance with the distribution proposed by Capt. T. H. Lewin and accepted by Dr. Riebeck. But these divisions, based as they are on the localities of the tribes along the rivers or on the hills, must by no means be supposed to represent either genetic or even de facto homogeneous ethnical groups. To details I shall again refer.

If in this sense the heads be considered, we get the following results:

Shape of Head	brachycephalic	mesocephalic	dolichocephalic
I. Khyoung-thâ (River Tribes).			
1. Magh (in the list Nos. 13—15)	2	1	—
2. Chakmâ (Nos. 16—18)	2	1	—
3. Toungjinya (Nos. 19—21)	3	—	—
Total	7	2	—
II. Toungh-thâ (Hill Tribes).			
1. Pankho (Nos. 4—6)	1	1	1
2. Banjogi (Nos. 10—12)	1	2	—
3. Mro (Nos. 22—25)	2 (1 ♀)	1	1
4. Kumi (Nos. 26—28)	1	—	2
5. Tipperah (Nos. 7—9)	3	—	—
6. Lushai or Kuki (Nos. 1—3)	2	1	—
7. Sho (Nos. 32—33)	1	1	—
8. Shindu (Nos. 29—31)	1	2	—
Total	12	8	4
III. Foreign Indian Tribes.			
1. Gorkha (Nos. 34—36)	1	2	—
2. Asamese (Nos. 37—39)	1	2	—
3. Manipuri (Nos. 40—41)	2	—	—
4. Bengalese (Nos. 42—44)	2	1	—
Total	6	5	—

Here we have at once a most striking contrast. Dolichocephalic heads were observed only amongst members of the Hill Tribes proper, although even here amongst 4 only out of 24, or 1/6 of the whole. If however the Tipperahs be excluded, for which the remarks of Capt. Lewin (Wild Races of South-Eastern India, London 1870, p. 215) offer some grounds, there remain 9 Brachycephals against 8 Meso- and 4 Dolichocephals. On the other hand not a single dolichocephal occurs either among the 9 Khyoung-thâs or the 11 foreigners.

The two solitary skulls of highlanders mentioned in anthropological literature are of Lushai provenance. They were taken from men killed in the campaign of 1872. Barnard Davis (Supplement to Thesaurus Craniorum, London, 1875, p. 29) calculated the index of breadth for one at 76, for the other at 73; that of height at 79 and 74 respectively. Hence the first was hypsimesocephalic, the second orthodolichocephalic, relations harmonising excellently with the above results. The capacity of both skulls was determined by Barnard Davis at 68 and 76 ounces avoirdupois, or 1355 and 1514 ccm. according to Welcker's Reduction Tables (Archiv für Anthropologie, Vol. I, p. 269). This is for the first a moderate, for the second a high measure.

From the linguistic standpoint these tribes may be more simply classified. Friedr. Müller (Allgemeine Ethnographie, Vienna 1879, p. 407) groups both the Kuki or Lushais and the Kumi and Mros, as well as the Arakanese with the Barmese or Lohita peoples. On the other hand Mongolic traits are detected by Captain Lewin neither in the Mros (p. 232), nor in the Lushais (p. 257), nor yet in the Shindus (p. 282), although he supposes that the majority of the Hill Tribes only migrated from Arakan some two generations ago (p. 73). Of the Lushais he says expressly: "They differ entirely from the other Hill Tribes of Burman or Arracanese origin, in that their faces bear no marks of Tartar or Mongolian descent". To this Dr. Riebeck demurs in respect of the Mros, while considering Lewin's statement (p. 241) probable, that the Pankhos immigrated from the South, and sprang from the great Shan nation in Barma.

Quite different appear to be the relations among the Khyoung-thâs. Here out of 9 measured persons we meet 7 brachy-, only 2 meso-, and not one dolichocephalic. And yet this is precisely the section of the people that comes in frequent contact with Bengalese immigrants. In fact according to Sir A. Phayre the Maghs or Mughs would even be sprung of a crossing of Bengalese women with Barmese. All local observers, however, agree that the lowland tribes possess essentially Mongolic features, and that they are closely related to the Arakanese. This, as seems to me, also results from Dr. Riebeck's photographs, in which the distinction between the upland and lowland tribes is most plainly shown.

The Gorkha, Asamese and Manipurî heads also correspond on the whole with what is known respecting these so called Indo-Mongolic tribes. Barnard Davis (Thesaurus craniorum, London 1867, p. 172) describes a series of Asamese skulls, including one Munipooree or Moité, which is hypsimesocephalic and according to him of undoubted Mongol type. Of the 6 other skulls in his possession belonging to sundry Asamese tribes 1 was dolicho-, 2 were brachy-, and 3 mesocephalic. On the Nepalese compare de Quatrefages and Hamy's Crania ethnica, p. 416, and Mantegazza (Archivio per l'antropologia e la etnologia, 1884, Vol. XIV, pp. 73, 96). The latter found in living subjects, chiefly men, brachy- and mesocephalous forms predominant, especially amongst Lepchas, Butias and Paharias, dolichocephaly occurring only occasionally amongst Paharias and Nepalese. Most surprising are the measurements of the Bengalese, who, however, may by no means have been of pure Aryan stock.

Coming now to a survey of the facial relations, Dr. Riebeck's numbers offer in this respect more ample opportunities for study, as he measured not only the zygomatic diameter, but also the malar and inframaxillar distance. In Table II three different facial indices are calculated on these data: The *jugal* (11), the *malar* (12), and the *inframaxillar* (13). From these groups I append as before a comparative table, merely remarking that for the two first indices as upper limits of the Chamæ-, or as I should prefer here to say, of the Euryprosopy, I have taken the number 90, but for the third 110.

Facial Indices	jugal		malar		inframaxillar	
Form of the Face	lepto-prosopic	chamæ-prosopic	lepto-prosopic	chamæ-prosopic	lepto-prosopic	eury-prosopic
I. Khyoung-thâ.						
1. Magh	1	2	1	2	2	1
2. Chakmâ	3	—	3	—	—	3
3. Toungjinya	2	1	2	1	2	1
Total	6	3	6	3	4	5
II. Toung-thâ.						
1. Pankho	1	2	3	—	1	2
2. Banjogi	1	2	3	—	—	3
3. Mro	2(1♀)	2	4	—	3(1♀)	1
4. Kumi	1	2	3	—	1	2
5. Tipperah	1	2	3	—	1	2
6. Lushai (Kuki)	1	2	1	2	—	3
7. Sho	1	1	2	—	2	—
8. Shindu	1	2	3	—	1	2
Total	9	15	22	2	9	15
III. Foreign Indians.						
1. Gorkha	1	2	3	—	3	—
2. Asamese	2	1	2	1	1	2
3. Manipurî	2	—	2	—	2	—
4. Bengalese	3	—	3	—	3	—
Total	8	3	10	1	9	2

Here also we have grouped differences similar to those yielded by the cranial forms. The wilder Hill Tribes are distinguished from the lowland tribes by narrower malar, and greater jugal and inframaxillar breadth. According to the malar index a third of the lowlanders are euryprosopic, but of the highlanders only 8.3 per cent. According to the jugal and inframaxillar index 62.5 per cent of the highlanders are eury-, relatively chamæprosopic, while of the lowlanders only 55.5 per cent have a euryprosopic inframaxillar index, and only 33.3 a chamæprosopic malar index. For the lowlanders the totals agree in the jugal and malar index, whereas for the highlanders this is the case in jugal and inframaxillar index — a sufficiently convincing proof how far the indications of a single facial index are from affording a complete picture of the form of the face.

Among the members of foreign tribes quite different proportions again present themselves. While in the jugal index leptoprosopy prevails amongst the lowland tribes, the foreigners agree with the highlanders in respect of the malar index, that is to say, their cheek-bones are much less distant from each other. But their inframaxillar index differs altogether from that both of the lowland and upland tribes. The distance of the maxillary angles is far less, and the number of leptoprosopic individuals greatly in excess.

The inframaxillar euryprosopy should stand in a certain proportion to the development of the masticatory muscles, which must of course also influence the jugal chamæprosopy. That in both cases the Hill Tribes, being far more addicted to a flesh diet, take the first place, is intelligible enough. At the same time the Mongolic descent should betray its special influence on the enlargement of the malar distance and on the greater prominence of the cheek-bones. On the other hand the stature has on the whole by no means so much influence as might be supposed. The example of the Maghs shows that spite of considerable bodily growth the distance of the maxillary angle does not always increase.

Unfortunately for a more extensive comparison of the facial proportions there is almost a total lack at least of numerical data. Barnard Davis has given us the facial hight (44) and the jugal breadth (50) of the skull of a Lushai about 19 years old. From this may be calculated a chamæprosopic index of 88. Mantegazza has determined facial indices of living men from Sikkim and Nepâl, all showing chamæprosopic relations, consequently little harmonising with Dr. Riebeck's measurements. This lack of actual measurements cannot be compensated by descriptions of the Chittagong peoples based on mere "impressions". Hence without dwelling further on these enquiries, I shall pass on to determine some peculiarities of development.

And first of all as regards *stature*, it is extremely doubtful whether the few available figures can suffice to fix the typical proportions. From these figures we should have to assume that the Maghs were the tallest race. The

maximum of 1.78 meter found in one of them with a grande envergure[1]) of 1.82 stands considerably higher than the figures for the other tribes. One Lushai and one Shindu alone reach 1.70[2]), and a solitary Manipurî 1.71 m. All others are lower, the smallest being the Pankhos (1.52—1.60 m.), the Asamese and Chakmâs coming next with 1.56—1.67 and 1.58—1.64 m. respectively. The Mro woman has the lowest figure (1.50 m.), and an envergure of only 1.48 m. which is consequently 2 cm. less than the stature. Such a negative difference, however, so far from being exceptional, occurs so frequently in the list that, assuming the accuracy of the measurement, it may be almost taken as a racial characteristic.

Dr. Riebeck speeaks expressly of the striking length of the arms among the Lushais. Yet according to his figures even this tribe shows a decided inferiority of the envergure compared with the stature: —3, —5, + 2. The Pankhos, Shindus and Bengalese yield minus differences alone, while no tribe shows exclusively plus differences. Of 44 individual cases 15 are plus, 28 minus, and in one instance both were equal. All these relations are so unusual, that I should fancy many errors have occurred either in reading off the measures or in copying the figures.

The case is quite different with the *relation of the foot to the stature*, discrepancies here being very slight. Only three times, with 2 Gorkhas and 1 Asamese, the foot length is contained seven times in that of the body. In seven instances (1 Tipperah, 1 Magh, 2 Chakmâs, 1 Toungjinya and 2 Bengalese) the figure is 6.9. Hence these would seem to be the smallest footed of all persons measured. The largest feet were found among the Lushais (once 6.2 and 6.3), with a Kumi and an Asamese (6.3 each), lastly with a Banjogi, a Toungjinya and a Manipurî (6.4). With all the rest the proportion varies from 6.5 to 6.8, consequently quite normally.

Touching the *length of the extremities*, column 2 of Table II certainly shows some high figures for the arm length obtained by summing up those of upper arm, fore arm and hand. One Lushai has an arm length of 88 cm., and one Kumi a still greater (88.7). Then follow a Toungjinya (86.4), a Magh (87.1), and a Tipperah (87.9), all others being under 84.6. But with many of these people the legs also are long, and column 4 of Table II, giving the relation of arm to leg, shows that the highest relative figures do not occur in the above mentioned instances. Thus with the Lushai this figure is only 81.1, but with the Kumi 91.5, and even 96.6 with a Sho, whose arm length is only 80.2. Considering the difficulty of at once accurately determining such measurements, too much weight should perhaps not be attached to this first attempt. On the whole I am unable to deduce from the figures any considerable disproportion of a general character in the several limbs. I would rather lay stress on a more important point, that is, the unusual great length in some cases of fore-arm and lower leg in relation to the upper arm and thigh, as appears from columns 5 and 6. Most striking are the figures for the lower extremities in the case of the Toungjinyas, with whom the length of lower leg reaches 96.3—97.4—98.2 per cent of the thigh. Then follow the figures for a Magh 95.9, a Lushai 95.6, a Mro 95.3, a Pankho 95.2; after which a Banjogi and a Manipurî with 94.7, a Chakmâ with 94.0, all certainly unusually high figures.

In Table I we have a column: *"Distance from middle finger to knee-cap"*, which might be important in determining a disproportion between upper and lower extremities. But this distance happens to be very deceptive, as the subjects being measured often unwittingly lower the hand by inclining one shoulder. Here the only remedy is for an assistant to keep the shoulders perfectly straight. If the figures in this column could be relied upon, the uncommonly short distance of 9.5 would certainly be had in the case of a Lushai. But the whole arm's length of this very man was only 76.3, consequently much less than that of the previously mentioned Lushai.

In far better accordance with Dr. Riebeck's statements respecting the outward appearence of the people are the measurements taken "round the calf" (No. 22 of Table I). Only it is certainly not quite easy with various individuals to find accurately corresponding places in the region of the calves, although it may probably be assumed that in all cases the greatest compass was taken by Dr. Riebeck. Then we see at once that of all measured calves properly speaking one alone was highly developed, and this was the calf of the 40 years old Mro woman (No. 25). Amongst the men only two Kumi had a girth of 39 and 37.1 cm respectively, one Tipperah 37, two Shindus, one Magh and one Gorkha 36 each. All others were lower, as for instance the Lushais 33.2—33.5—34, certainly little enough for such powerful men. But it is still considerably higher than amongst the Bengali officials, who could show a compass round the calf of only 28—29.5—30.5, much the same figures as I have obtained from Australian subjects.

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[1]) By grande envergure is meant the distance between the tips of the middle fingers with the arms outstretched crosswise (Broca).

[2]) Lewin gives for the Lushai men a mean height of 5 feet 8 inches, or 1.73 m; for the women 5 ft. 4 in. or 1.63 m. From this we should have to suppose that this tribe has relatively speaking many tall members.

The case of the Mro woman shows, however, how cautious we should be in depending on such figures. This woman was evidently very stout, as shown by numerous other compass measurements taken on her. I need merely quote that of the chest "under the arms", which was 92.5 cm., while of all the men four only measured over 90 round the chest — two Asamese 91 and 93, one Toungjinya 98 (the highest recorded), and a 23 years old Bengalese 97 with very poor calves (compass 28 cm.). Altogether the chest measurement is high only amongst the Toungjinyas, who yielded 89—90—98. The lowest figure, 79, was found on an 18 years old Tipperah and another Bengalese. All others oscillate between 80 and 90, thus showing mainly satisfactory, although by no means superlative, proportions in the pectoral development.

It is clearly impracticable to determine any typical differences between the several tribes on the ground of such scant measurements, which are themselves not even absolutely free from cavil. Were they to be accepted as conclusive, we should have to recognise greater discrepancies between neighbouring tribes, than between those living further apart from each other. The three Toungjinyas who were measured are distinguished by considerably higher measurements than the Chakmâs, standing in this respect nearer to the Lushais than the Pankhos. Hence all off-hand phylogenetic conclusions must for the present be waived. Here it is precisely the same as with certain customs, which at first sight seem to possess a diagnostic significance.

Thus Lewin (p. 240) draws attention to the fact that the Pankhos, like the Tipperahs and Lushais, gather up the hair in a knot behind, whereas this knot is placed on the anterior part of the head (see pp. 231, 281, 286) by the Banjogi, the Kumi and Shindus, who for this reason are collectively known as Poy. But the Khyoung-thâs also mostly tie up their long hair in a knot on the neck, in contrast to the Rakoing-thâs (Arakanese) and Barmese, who bind it up on the crown. No genetic connection can be inferred from this practise. Better than by any theory of ethnical descent it is explained by the legend mentioned by Lewin, according to which the difference has its ground in historical events, at least in the case of the Khyoung-thâs.

It is probably much the same with the funeral rites. The lowland tribes burn their dead (Lewin pp. 131, 184), whereas the Hill Tribes bury them (pp. 237, 242, 246, 273, 286). But the Tipperahs also practise cremation, a custom obviously introduced from India. In interments it is noteworthy that the bodies of chiefs are deposited in a sitting posture. Most divergent are the usages of the Lushais, who dry the bodies artificially, which, however, is diversely accomplished in the various clans. Amongst the Dhun and Khoon clans the head is cut off and preserved separately, the other parts being deposited in an earthenware vessel (pp. 273, 280). The Shindus inter the dead in a grave lined with stone, chiefs and distinguished women seated with their arms, finery and badges of rank (p. 286). The more savage tribes are precisely those that still adhere to interment, while the more civilized have adopted cremation.

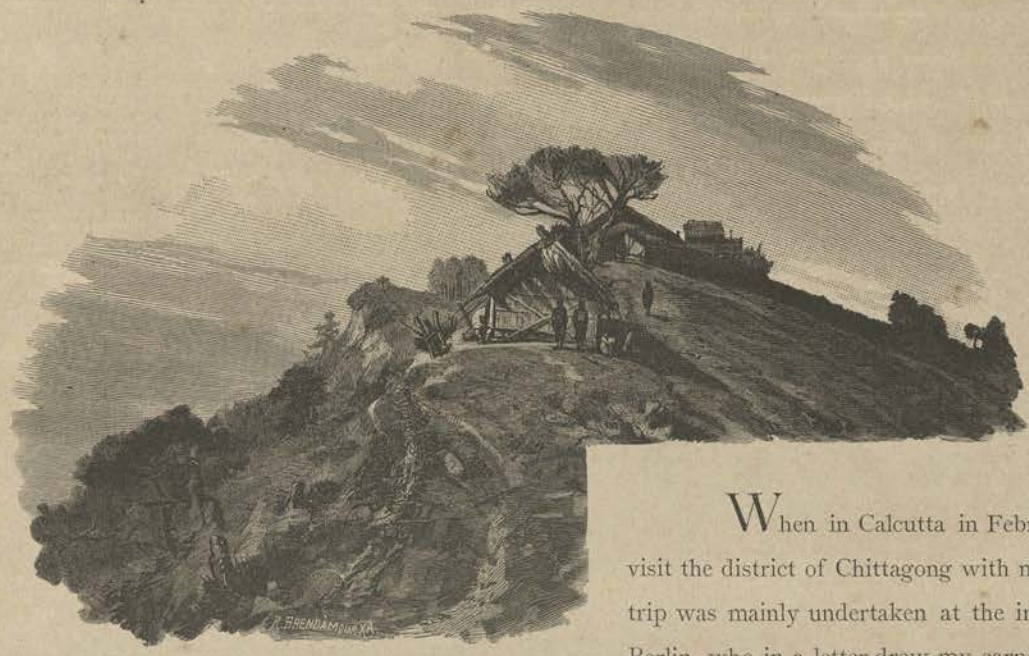
The circumstance that the lowlanders have a yellower, the highlanders a darker complexion, also indicates the purer descent of the latter. In this respect also the former approach their southern Barmese neighbours, and even the Malays, as Pemberton supposed. The latter on the contrary rank rather with the so-called aborigines of India. In my work on the Weddas of Ceylon (p. 125), I deal fully with the question of the primitive Indian tribes, the "black skins", as they are called, and have examined the theory of an aboriginal Negrito population spread over the whole of India, advocated especially by French observers. None of the Chittagong Hill Tribes lend any support to such a hypothesis. According to unanimous testimony they have all *black, long and smooth,* but by no *means straight hair,* and although not athletic, their stature still at once separates them from the dwarfish Andamanese and Negritoes. On the other hand in further enquiry the question cannot be waived, whether the Hill Tribes of Chittagong, perhaps also of Nepâl, may not after all be somewhat nearly related to the primitive "black skins" of India. The name Dasyu or Dasa recalls in a remarkable manner the word Dzo applied both to the Lushais and their speech, or according to Friedrich Müller (op. cit. p. 407, note) even to all tribes wearing their hair bound in a knot on the neck, in contradistinction to the Poys.

I admit that such resemblances of tribal names cannot decide much. When, for instance, the Lushais or Kuki are called Lankhé by the Barmese (Lewin p. 247), this name strongly suggests the old word Lankâ applied to Ceylon, whose inhabitants an old tradition in fact brings from further India (Virchow, Weddas, p. 99). Both the style of hair of the Singhalese, and their general dress, especially the use of an undergarment, their dark complexion, long smooth black hair in many ways recall the Hill Tribes here in question. But the form of the Singhalese skull inclines far more to dolichocephaly than has yet been observed at least amongst any of the Hill Tribes in Southeast-India, while the form of the face has frequently a pronounced Aryan character. Whether the Dzo are consequently really akin to the Singhalese, or whether we have here merely a number of accidental resemblances, may for the present remain a moot

point. The linguistic contrast might however be explained. In respect both of their physical and linguistic characteristics, it should not be overlooked that the tribes of Southeast-India have been exposed to a number of interminglings and cultural influences, and that very different fundamental elements are brought into relief, according to the various qualities under consideration.

As in the case at the outset of all accurate enquiry, Dr. Riebeck's observations have given more prominence to this mixed character than might have been expected from previous reports. They might perhaps be easily undervalued, in so far as they do not suffice to remove existing doubts and clear up the phylogenetic relations. But their significance is precisely this, that they entirely get rid of certain possibilities, while in other directions reducing the questions to a narrower issue. The dark Chittagong Hill Tribes we now know are neither Negritoes nor yet Arakanese. In them an element presents itself which is also frequently observed elsewhere in India, an element now often characterised as "Turanian", but which anthropology has hitherto failed accurately to determine or define in its relation to the Mongolic types. Much work has yet to be done before the goal is reached. But the nearer it is approached, the more thankfully will those men be remembered, who have laid the first real corner-stones of the scientific superstructure, and Dr. Riebeck may rest assured that his work has not been in vain.

I. THE JOURNEY.



Frontier Fort of Sirtay II.

When in Calcutta in February 1882 I first resolved to visit the district of Chittagong with my fellow-traveller Rosset. The trip was mainly undertaken at the instance of Professor Bastian of Berlin, who in a letter drew my earnest attention to the importance to this district, which with the neighbouring highland populations seldom attracted the curiosity of European travellers. Although fully alive to the difficulties of the undertaking, I eagerly followed his advice, and made all due preparation for my self-imposed task. Nevertheless our first essays were far from encouraging. To begin with we completely failed to secure a suitable interpreter, and in those regions the interpreter is as indispensabel to the traveller as is a crutch to the cripple. Most of those applied to were scared by the cholera demon, who was popularly supposed to have his chief stronghold in the Chittagong district. Then the person ultimately engaged disappeared for good and all with his earnest-money before the start. But time was pressing, so that we were fain meanwhile to dispense with such a guide on the route. The luggage had then to be carefully sorted, the absolutely indispensable being alone retained and reduced to an easily portable form. Such precautions are not to be overlooked in a country, where rocks, ravines, jungle and primeval forest present every obstacle to the wayfarer, and where watercourses obstructed by cataracts form the chief arteries of communication.

In far from buoyant spirits we left Calcutta on February 13. on board the British India Company's steamer "Comilla", arriving after a rough passage of 36 hours at the bar of the river Karnaphuli. Proceeding thence up stream we landed at the city of Chittagong about noon on Sunday, February 20. The whole place, English and Natives, were keeping the sabbath. Amongst the blessings of European civilisation the English Sunday, with its complete suspension of business, here enjoys the highest degree of popularity, so that we found it impossible to obtain any assistance on landing. The want of an interpreter was at once most acutely felt, for we lacked all means of communicating with the natives. So we remained over night with our luggage, and were only too glad next morning to find a refuge in the Dak Bungalow.

But our departure for Rangamati was delayed for nearly a week, a week of endless plagues and worries, which put our patience to the severest test. The fault apparently lay mainly with the English officials, who seem to be held in little respect by the natives. We found ourselves overreached in the pettiest transactions. The universal mistrust, which constant payment in advance failed to overcome, prevented opportune purchases, and our complaints were usually followed by an adverse decision, although we were unconscious of any unfairness on our part. From day

to day we found the promised departure of the steamer put off, which plies between Chittagong and Rangamati. Yet a single energetic step on the part of the magistrate would have undoubtedly put an end to the skipper's dilatoriness. This official remissness was all the more inexplicable, that we were in other respects treated with marked courtesy, introduced to Chief-Justice F. E. Bignold and to Dr. Sanders and admitted to the Club and private circles, seemingly to indemnify us by social amenities for the failure of magisterial support.

But all this involved the loss of much valuable time, while the hope of procuring an interpreter still remained unfulfilled. To the dread of fever and cholera was now added a fresh source of alarm — the report of the rising of the independent Lushai tribe, which was said to have already crossed the British frontier. Thereupon the doughtiest failed to muster courage to enter our service as interpreters, and we decided, aided by Dr. Sanders alone, to deal independently with the natives, and procure from them diverse not altogether worthless ethnological objects. The time was made to hang as pleasantly as possible on our hands, and with my boat built in separate pieces an experimental trip was even arranged, which however had well nigh cost me my life; for I slipt and fell into the water, and would have inevitably perished but for my English companions, Messrs. Manson and Fasson, who were good swimmers.

At last came the hour of redemption. On February 25 the government commissioner Mr. E. E. Lowis invited us to embark the same evening on board a small paddle steamer, which was next morning to leave with the tide for Rangamati. We were at the same time accommodated with several smaller barges, which were taken in tow by the steamer. My distinguished recommandations to the governer in Calcutta had wrought this miracle; for it was little short of a miracle at a time when all available craft had been "requisitioned" for the transport of rice to Damargiri. Both in that district and in the Lushai territory a frightful famine had broken out, and it was hunger rather than any love of fighting that had driven the Lushais across the English border. We passed a decidedly cold night on the river in company with the government commissioner, who joined us on the trip to Rangamati, and at daybreak our little flotilla heaved anchor.

Rangamati on the Karnaphuli-River.

The journey passed without any noteworthy incidents. Till noon nothing was visible except flat land on both sides of the Karnaphuli, though there was no lack of settlements or villages consisting of small bamboo huts. The river itself teemed with small boats and bamboo rafts. On these the highlander sends down his raw cotton to Chittagong, taking in exchange all kinds of provisions and wares, such as dried fish, salt, spices, hardware, and other produce of the lowlands. But his most valuable commodity are the rafts themselves, on which he floats down the river; for the bamboo stems of which they consist form the best building material in the district, hence are highly esteemed and command good prices.

Towards noon the prospect changed. We had then reached the spurs of the range, at the foot of which lies Chandraguna. Here was formerly the residence of the Deputy Commissioner for the Chittagong Hill Tracts, which has since been removed to Rangamati. But for the impenetrable thickets, the bananas and other tropical growths, we might have fancied ourselves suddenly transported back to the highlands of the Weser basin in the fatherland, so striking was their resemblance to the shifting riverain landscapes now revealed to our gaze. Grateful mention may here be made of the genial courtesy of government commissioner E. E. Lowis, whose travelling guests we had been.

Rangamati, which we reached about four o'clock in the afternoon, is scattered in picturesque groups on the crest of several hills and, as above remarked, is the residence of Deputy Commissioner L. R. Forbes. This gentleman

received us on landing, and hospitably placed his spacious bungalow at our disposal. Here we found both shelter and a pleasant cool retreat; for the houses being erected on piles six feet high afford everywhere free circulation to the mountain breezes. Hence in spite of the sultry heat of the sun we enjoyed in Rangamati an agreeable and bracing atmosphere. Our night's rest was at first disturbed by the scampering of the bamboo rats and the shrill cry of the geko. But once the ear gets accustomed to these noises, their uniformity combines with the soughing of the wind to produce a soporific effect. Here as all the world over, the English live after the English fashion, the old homely ways clinging to them like the very soles of their feet. They eat more curry, more rice, more poultry than in England; but in other respects they eat, drink and play lawn tennis, just as if residing within a few hours of London.

Bungalow of Deputy Commissioner Forbes at Rangamati.

The first morning passed in Rangamati brought me a pleasant surprise, in a visit from the garrison physician Dr. Brojonak Shaha, a Bengali, under whose guidance I inspected the hospital and barracks of the Goorkha and Assamese troops stationed on the frontier. I was exceedingly amazed to meet at this advanced outpost of European culture a man not only thoroughly acquainted with English and French, but also possessing a tolerable knowledge of German, and who moreover kept abreast of medical progress by means of the most recent productions of the German book market. Willingly acting as my interpreter, he helped me in the purchase of sundry fancy articles, which are prepared by the Bengali for the Maghs, as well as of a number of wrought iron objects, such as axes, hatchets, hunting knives (dâo) and hammers.

Major Pughe's Bungalow in Rangamati.

An unexpectedly favourable turn was given to the expedition by a proposal of Commissioner Forbes, to which I readily assented. It was suggested that I should join a reconnoitering party of English soldiers along the frontier between Damargiri and Ruma, receiving an escort of thirty men under Major Pughe, and for the same purpose engaging fifty coolies at the daily rate of eight annas or half a rupee each. Both parties found their advantage in this arrangement. For the government the essential point was to get large supplies of rice forwarded to the frontier to relieve the pressing wants of the Lushai tribes, who were suffering from famine and had moreover been attacked by the warlike Shindus, hence had sought shelter and food in British territory. The provisions were to be conveyed to them by my coolies, while in the famine I recognised my best ally in my intended barterings. Nor was I deceived in my expectations,

as subsequently appeared. Objects for which under other circumstances the Lushai would have asked high prices, they now eagerly parted with for a little rice.

I accordingly hastened back to Chittagong in order to meet the requirements of the new program, my equipment having been originally calculated only for a short excursion to Damargiri and neighbourhood. My arrangements were soon completed, and I even found time to visit in company with the well-informed and courteous Dr. Sanders the local prison and hospital. I also examined the photographic sketches procured with must industry by my fellow-traveller, Rosset, for ethnological and anthropological purposes. Here a Madrasi interpreter was again engaged, but with an instalment in his pocket he disappeared before our vessel ran out of harbour. Hence I was again compelled to dispense with the services of such a valuable assistant.

About sunset or March 8. we started in three boats from Rangamati for Damargiri. The moon afforded us a friendly light, while with his usual condescension Dr. Sanders provided for our entertainement. But neither one nor the other could quite remove the disagreeable impression caused by the frightful stench of the bilge water in our boats. Yet these boats, at least according to native ideas, were by no means badly equipped. They consisted of a single trunk of a tree, were furnished with four oars, and afforded the necessary accommodation for sleeping and protection against the scorching rays of the sun. We took our seats in the first, the cook and two orderlies in the second, the third being reserved for our somewhat bulky luggage. During the trip the numerous jungle fowl and peasants afforded us some good shooting.

The first stop was made at Kasalong, a Chakma village. Scarcely had we landed when we found ourselves surrounded by a band of Haulong Lushais, who had penetrated some twenty-five days' march from their district into British territory, in order to eat their full of the English supplies of rice. This however they seldom succeeded in accomplishing. The rations distributed to them never sufficed to appease their hunger, and I was thus fortunately enabled to obtain for a handful of rice more articles than under ordinary circumstances could have been procured for ten times their money value. I had provided myself with an abundance of rice, and in any case could have obtained as much as I wanted from the English. The Lushais were not altogether indifferent to money. But the rice was a more attractive bait, and thus many articles passed into my possession, which could not have otherwise been had "for love or money". This enabled me here to make an ethnological collection from a comparatively large domain of nine moribund tribes differing in speech, habits and customs. Such a collection is not to be found even in England, otherwise so richly endowed in this respect, although a number of eminent government officials and writers, such as Lewin and Hunter, have resided for many years in the district. For my success I was indebted to the exceptionally favourable relations prevalent at the time.

It was interesting to notice the harmless curiosity with which the Lushais observed us at breakfast. Men, women and children never wearied studying our movements and demeanour. They were especially excited at our fair complexion, a proof of how rarely they are visited by Europeans. But when I began to wash my arms and chest, they pressed close round, and even tore off my shirt in order to subject my body to a more searching scrutiny.

They looked themselves all alike, men and women wearing exactly the same garments. The question, in what they are outwardly distinguished, might form a suitable subject for an ethnological prize essay. The answer is, however whimsical it may sound, in their tobacco pipes! For all alike, young and old, men and women, smoke like furnaces. But while the pipe of the men is made of a bamboo knot or of wood, occasionally mounted with tin and entirely destitute of a secodary outlet, that of the women is of clay with a small bamboo receptacle, in which the nicotine flows off when smoked. The latter is then collected in a gourd, and sipped from time to time, as a preservative for the teeth and gums[1]). On closer inspection we may of course detect sundry points of difference, which however are far from striking the senses so forcibly as their different methods of smoking. Thus the men wear earrings of lead or Barmese amber beads strung on threads, while the women insert in the distended lobe large round clay wooden or ivory disks rather larger than half-a-crown. Indispensable to the complete male costume are also the hunting-knife and the pouch-like bag containing pipe, tobacco, steel and such like valued little articles. Their long black hair they bind up in a knot kept together by a brass or steel pin, or occasionally by a comb. The combs consist of bamboo splinters strung together like teeth and provided with a brass, copper or ivory clasp. The neck ornament is a string of bits of amber, which comes from Barma and is highly prized. Unfortunately I failed to secure any of these family heirlooms, being unwilling

[1]) Woodthorpe, The Lushai Expedition p. 77.

to pay the unreasonable price of a thousand rupees, a price, which is in fact intended to be prohibitive. For the same reason I had to relinguish another object, an amulet consisting of nothing more than the tuft of a goat's beard. This is worn on a string round the neck. It serves as a charm against all manner of ailments and perils, and is seldom or never laid aside, for the Lushai would then immediately fancy himself threatened with some pending danger. The men occasionally wear a kind of toga as an outer garment; but when at work they limit themselves to a strip wound as a loin-cloth round the hips and between the legs. The women's loin-cloth reaches to the knees, and is kept together by a chain or girdle. They also wear a breast-cloth, probably through bashfulness under the gaze of strangers. All these materials are of cotton, cultivated, spun, dyed and woven by themselves. Simpler is the garb of the children, who go stark naked.

On leaving Kasalong about eleven o'clock, we ascended the river for several hours till arrested by the Peskiserra Falls. Here began a fresh chapter of accidents. We had to land all our luggage, and get it transported by coolies over the hilly portage to a point above the falls. The boats of Dr. Sanders and Major Pughe alone could be drawn by the soldiers with great efforts over the boulders and foaming rapids to the other side. We were ourselves obliged to avoid inaccessible places by long detours, arriving at ten o'clock on the morning of Friday March 10 at the military station of Barkhal, a small bamboo fort with 27 soldiers and a pretty police officer's bungalow crowning an eminence. The picturesque charms of this station are indescribable, and unrivalled for beauty in the whole valley of the Karnaphuli. The impenetrable wilderness along the river banks with their exuberant tropical vegetation, and the tumultuous waters of the rapids rushing wildly along, surpass any similar scenes even in the virgin forests of Ceylon or the mighty woodlands on the Malabar coast. Great was the temptation to devote ourselves to the investigation of this magnificent but unknown flora, and of this equally unexplored fauna. But our goal lay in another domain, that of ethnology, and we were accordingly satisfied with a solitary zoological find, the skull of a large ape killed by Dr. Sanders after leaving Barkhal.

After overcoming several large rapids we reached Utan-Chattra above Barkhal, and were here met at dusk by men bearing torches. Next morning we pushed on to a point where the Karnaphuli trends almost at a right angle for a space of several hours. As the apex of the triangle seemed almost blocked by fresh cataracts we struck across country on foot in the direction of the hypothenuse, thus again reaching the river about two hours before the arrival of the boats themselves.

Towards two o'clock in the afternoon we caught sight of Damargiri, where we were to meet the reconnoitering party proceeding to Ruma. Damargiri lies on an eminence encircled by the winding bed of the Karnaphuli. Till recently it was inaccessible even to small boats; but since then various narrows have been blown up with gunpowder and thrown open to river traffic. We landed at the Resident's bungalow, half of which was readily placed at our service, and made our preparations for the above-mentioned reconnoitering expedition. But here a bitter disappointment awaited us. It was found impossible to organise our party. Neither for rice nor gold were the indispensable coolies to be had. Yet there was no lack of Lushais. The Tangloa, Haulong and Pakhoma Lushai[1]) tribes were loafing about in picturesque groups. Voracious bamboo rats had fallen in millions on their fields, destroying the rice crop and compelling the people themselves to migrate into British territory, where, as above described, they were provided with the necessary supplies. Rice they gladly accepted as a gift, but not a word about any returns for the favour. They could not even be induced to lend a hand in improving the roads leading to their villages and to the military stations, although well aware that these stations were their only protection against the raids of hostile wild tribes. Hence the unfortunate troops continually patrolling between the outposts, were obliged to open up the routes themselves through the impenetrable bamboo thickets, certainly no child's play. Nowhere else was the weakness of the British administration in the presence of such riff-raff brought more vividly home to my imagination. It might seem as if here high and low alike were animated by the spirit of the watchword: "Masterly Inactivity at any cost, even under possible humiliations". Love of truth however obliges me to make an exception in favour of a young English Officers named Parish, who although stationed here only for a short time, contrived by the application of rigorous repressive measures to introduce some order in the menagement of frontier affairs. To him, to a certain sergeant and to the brandy flask I am indebted that my excursion to Damargiri did not end in a complete fiasco. For the rice had here entirely lost its purchasing value, since the necessary supplies began to be gratuitously distributed. The authority of the young officer,

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[1]) See Group, Fig. 3. Plate 3. Tangloa, Haulong and Pakhoma are the names of the chiefs, after whom the tribes and villages are designated.

who had inspired the Lushais with a wholesome respect, now stood me in good stead. Then came the sergeant with his knowledge of the language and exceptional tact in dealing with the natives. And lastly, when both of these influences proved ineffectual I appeared on the scene with my brandy bottle, a bait few of the Lushais could resist. The brandy I concocted myself by diluting spirits of wine with water, and colouring it with burnt sugar, thereby producing a still more alluring drink for their uneducated palate. In return they not only parted with a large quantity of their implements, but also allowed me to take bodily measurements and submitted to be photographed by my fellow-traveller, Rosset. If for brandy I had substituted money, this would have soon found its way into the pockets of the Bengali dealers, who cozened and plundered the natives to the utmost. I may therefore be pardoned, if I preferred to tickle the palate of the Lushais with "fire-water", rather than play into the hands of the bloodsucking usurers.

Goorkha frontier troops at Damargiri.

The still available time we utilised partly in excursions to the frontier military station of Sirtay, No. II four miles off (see vignette, page 1), and to the villages of Tangloa and Pakhoma, partly in negociations with a native chief for the purchase of valuable ethnological objets. On the the trip to Sirtay we were accompanied by Major Pughe, Dr. Sanders and Herr Rosset. The route was magnificent, gradually ascending through a wooded tract to a height of 1780 feet. In the village of Pakhoma we inspected the huts, which were all built of bamboo, without the least aid from any foreign structural appliances, such as nails, plugs or cordage. To avoid the jungle fewer they stand on a wooden platform several feet above the ground. Probably for the same reason the villages themselves are perched on hill-tops, and enclosed by bamboo palisades, the numerous pointed ends of which give them somewhat the appearance of little fortresses. No house is without its loom, and a large bamboo basket, which is set apart as a receptacle for valuable household effects. There are no locks, and in the absence of the proprietor his next-door neighbours take charge of the house, the door of which is slightly closed up.

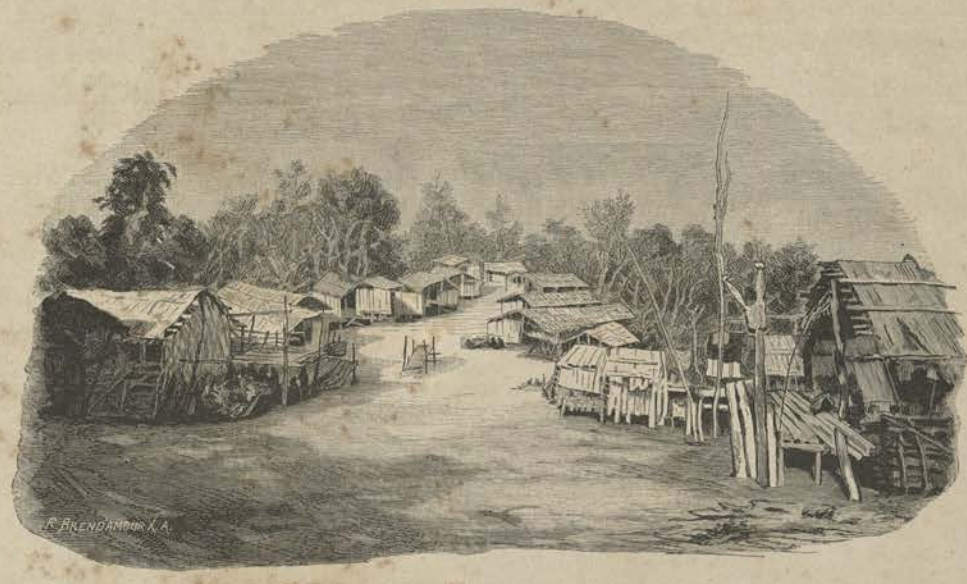
Interior of the frontier Fort Sirtay.

At the frontier station of Sirtay, garrisoned by a detachment of Goorkha infantry, we tarried a short time, partly to take a full survey of the surrounding district from the peaked cone on which it stands, partly to await the cooler hours of the afternoon before returning to Damargiri through Pakhoma. Here also we halted for the purpose of photographing the main thoroughfare together will a loom, which stood at full work on the road[1]).

On Monday March 13 while we were occupied taking photographs of various members of the Tangloa tribe, we received a visit from the Pakhoma chief[2]), who gave expression to his friendly feeling by presenting me with his pipe, tobacco pouch and contents. I had naturally nothing more opportune on hand than to pay him a return visit

[1]) See woodent Plate 12.
[2]) Plate 3. Fig. 1.

next day in company with our polyglott sergeant. Scarcely had we entered the chief's bamboo hut, when the village elders assembled round us, and after an interchange of much circumstantial greeting, asked my pleasure. I gave them a suitable answer, accompanying my remarks with a few bottles of brandy, which, as I had rightly anticipated, soon secured me the universal favour. The chief himself did us the honour of subsequently acting as Cicerone on our rounds to all the houses in the village, besides by his countenance facilitating the purchase of every variety of objects. After the inspection of all the houses, he let fall the remark that he was in possession of a costly ornament[1]), the insignia of his rank. Thereupon I plied him with more brandy to induce him to part with it, in which after some show of resistance I at last succeeded. To it he added a specimen of his daughter's weaving, which with the headdress in question formed the most valuable part of my Chittagong collection. Next day (March 15) we took measurments and photographs of various members of the Pankho, Tipperah and other southern tribes, and after recording a number of meteorological observations made our preparations for the return trip down to Rangamati.



The Lushai village of Pakhoma.

This return trip by no means forms one of the pleasantest reminiscences of my travels. It began with the dismissal of my two orderlies, one a thief, the other given to drink. And although they were soon replaced, I should have fared ill, but for the timely aid of my sergeant, Stevens, who again on this occasion proved himself an honourable and obliging person. We were so suddenly benighted that we had to pass the Utan-Chattra rapids in the dark, a risky venture even by day, as shown by the numerous victims recently swept away by the whirling waters, but all the more dangerous at night when in the hands of a bad or unskilful crew. Had the boat capsized no swimming could have saved us, so steep were the rocky banks of the stream.

House of the Pakhoma chief (Lushai).

On March 17. we reached a Chakmâ village, where we purchased a few objects, pushing on the same day to Barkhal where a crowd of Lushais were busy cooking their rice in bamboo vessels.

Next day we paid them a visit, and also inspected the settlements of the Tipperahs, who have reached a higher degree of culture, the Pankhos and Banjogi occupying an intermediate position between them and the Lushais. The bamboo houses of the Tipperahs are most carefully constructed; their implements are also highly finished, while their musical instruments are alone really worthy of the name. Rosset on his part started early in the morning on a

[1]) Plate 2. Fig. 9.

hunting and fishing excursion, bagging several fine specimens of fish and birds. In the afternoon measurements and photographs were taken of a number of Banjogi.

On Sunday, March 19. we shot the cataracts below Barkhal, where we were again exposed to great danger by the conduct of our lubberly boatmen. While transporting the baggage we were also overtaken by a violent storm, which drove us to seek temporary shelter in a neighbouring barn. Next day we reached Peskiserra, and on March 21 landed at the government bungalow over against the village of Kasalong. The same evening I called upon the Raja of the Chakmâs, who resides in the chief settlement at this place. He gave me a friendly welcome, with a ready assent to all my requests for the following day. Accordingly on waiting on him next morning, he gave me a complete apparatus for distilling rice-brandy[1]) (arrak), the favourite drink of all these hill tribes. He also accompanied me round the village, without however procuring me access to more than one house. At sight of us old and young took to flight, so that here our ethnological spoils were of the slightest.

In the afternoon we at last succeeded in securing plaster casts of a Tipperah face and of a Lushai foot. We also photographed the chief and various parts of the village, and then started for Rangamati, which we reached after a night's journey. We landed at Mr. Parish's bungalow, where we were not the only guests, for an Indian bishop had already taken up his quarters here, for the purpose of holding services in the bungalow itself.

Bamboo house in the Chakmâ village of Kasalong.

The ensuing days were given up to excursions to various Magh and Chakmâ villages, with tolerably successful results. Meantime my fellow-traveller took photographs of the members of the English settlement, while we photographed and measured the chief native types, amongst others some Banjogi, Tipperahs and Chakmâs, and a number of the frontier troops, who are mostly either Nepalese Goorkhas, Manipuri or Assamese.

On March 29 we left Rangamati for Vershaserra, in a district whose picturesque beauties held out great temptations for a lengthy sojourn. In company with our host, a tea-planter, we visited several Chakmâ and Magh villages, procuring on this occasion several valuable ethnological treasures. Then we hastened back to Chittagong. As tide and wind were against us, while on the other hand I had no time to wait for the ebb, I gave up the attempt to get down the river by boat. Crossing the wide and agitated stream in a frail little canoe I started overland for Chittagong, where I arrived about noon.

Thus was brought to a close our first great exploring trip. Although not perhaps the pleasantest imaginable, it was all the more productive of rich ethnological collections, which after all was the main point.

In Chittagong the necessary preparations were at once commenced for our second expedition, which was to proceed up the river Sangu by Diwanhât, Bandraban and Ruma to Meduserra, thence crossing the lofty Kantratong range to Dalakmey on the Koladan river, where our exploration of Chittagong was to terminate. As before, our first step was to secure the services of a cook and man-servant. The person I selected for the latter position had already been three times imprisoned, and as he began at once to "live up" to his former career, I had to discharge him the very day after our departure.

On the night of April 4—5 we set out, with the turn of the tide crossed the canal connecting the Karnaphuli with the Sangu river, and landed at Diwanhât.

Next day we reached a village "outside the district".[2]) From this point our progress was slow, as we had constantly to await the flow, the river at ebb being too shallow for easy rowing. Most of the time our crew were floundering about in the water, pushing the boats across the numerous shallows. However the boat containing the luggage and kitchen arrangements got on better, thanks to their lighter draft. This, combined with the magnificent

[1]) See Plate 12. Fig. 10.

[2]) bengâlî: bahar zillah, not the name of the village, Lewin.

prospect of a rich and highly cultivated district helped meantime to keep up our spirits. The Sangu differs altogether from the Karnaphuli in the character of the riverain scenery. While the latter is everywhere overgrown with primeval forest and jungle, the tracts watered by the Sangu yield plentiful crops of rice, tobacco, corn, red pepper, sweet potatoes, and all kinds of vegetables, especially gourds and melons. Its fauna is of an equally diversified character. Countless birds of all sizes, pigeons of divers colours, three species of snipe, pewet and other members of the feathered tribe impart a special charm to the scene. The river itself is alive with traffic, and we passed many bamboo rafts laden with the so-called "sunn" jungle-grass, and guided down stream by Bengali boatmen. As the river banks swarm with birds, so the water teems with fish, which afford the native riverain populations a delicious accompaniment to their curry. These populations consist of Maghs, Bengalese, Mro, Mru and Kumi tribes.

From the spot where we landed for breakfast I shot large numbers of pigeons, snipe and moorhens. After a refreshing evening bath, we proposed to reach Bandraban by moonlight in the cool of the night. But our crew struck work, so that we had to pass the time till dawn at our landing place. Here began our troubles. The river became continually shallower and the bamboo rafts more numerous, so that it was two o'clock before we reached Bandraban, where we received a hospitable welcome at the government bungalow. This place, like all others hitherto visited by us, lies on an eminence prettily wooded with shady trees. Seen from a distance its graceful bamboo houses give it a picturesque aspect, while on approaching nearer the visitor is cheered by the busy life of its little bazaar thronged with Bengali dealers. The town is inhabited mainly by some Magh tribes, who have migrated hither from Arakan. I was soon honoured by a visit from the son of a chief, a friendly interchange of several cigars testifying to our mutual good will. The old chief himself, whom I called upon next day, I unfortunately found stupified with opium. With a stolid expression of countenance he promised everything I asked, but not one of his promises was kept. From his sick brother, however, by holding out prospects of medical aid, I managed to obtain some old Buddhistic palm-leaf manuscripts in the Barmese character, besides two valuable shields.

Frontier soldier.

In Bandraban we tarried two days, chiefly in order to exchange our large boats for smaller ones more suitable for these shallow waters. These we yoked together in couples by means of bamboo poles, erecting on them pretty little bamboo arbours as a shelter against the rays of the sun. Our traps were of course also reduced to the absolutely indispensable.

Here my fellow-traveller Rosset left me, and returned to Chittagong by a regrettable misunderstanding taking with him our medical chest, the want of which later on well nigh cost me my life.

Scarcely had we turned our backs on Bandraban, when heavy thunder clouds began to bank up. We hastily dispatched our crew to the beach for some leaves of the wild banana, with which the cover the roof and walls of our little houses and so protect ourselves from the rain. But the storm presently burst with such fury, that we expected every moment to be swept away boat and all. The sky looked like a sheet of flame; thunder and lightning followed in rapid succession; the rain came on in a downpour, such as is possible only in the tropics; the very earth seemed to quake. Never in all my travels have I seen the elements lashed to such a pother.

After the storm was over we enjoyed a trip rich in varied incidents. Along the banks mighty forest giants stretched their branches heavenwards, their boughs festooned with a glorious growth of flowering orchids, their dark stems wrapped in the soft green foliage of twining creepers. This marvellous picture of a superbly tropical vegetable life was completed by huge tree-ferns towering aloft. Here, however, our boats made way only by fits and starts, the full physical strength of their crews being constantly required either to stem the swift current or drag them over the shallows. On the evening of April 10. the storm rose again, a sure sign of the approaching rainy season.

Ruma was reached about ten o'clock in the morning of a lovely bright day. Here everything breathed the spirit of cleanliness and order, while we experienced the special attention of the government Official, Mr. Jarbo, who

welcomed me at the residency. He supported me in all my undertakings and accompanied me on my various excursions in the neighbourhood. Our first visit was to a Magh village, from which we brought back some interesting objects.

The present Ruma is quite a recent settlement, a couple of miles from the old place, which lies much lower down. Apparently on sanitary grounds the inhabitants of the old town are also gradually removing to the crest of the hill, where the government buildings and barracks have already been erected. The latter afford accommodation for a numerous garrison of Goorkhas, who from this point are distributed amongst the frontier stations, and keep up monthly communications with Arakan.

The day after our arrival three of the Mro tribe with two women made their appearance. They were the first who consented to our taking measurements, photographs and plaster castings, since we had begun to turn our attention to these anthropometric processes.

A great treat awaited us in a village inhabited by Maghs, which we reached by ascending the river in our boats. For we were here most hospitably welcomed by Goseri, the village headman, who arranged in our honour a dramatic performance, at which we assisted in a bamboo hut open on all sides. The play was introduced and accompanied by the music of two kettle-drums, a clarionette, a split bamboo pipe and the clapping of hands in unison. The actors moved in a dance measure round about a central bamboo pole, swinging their arms up and down, and incessantly bending the knee. The drift of the plot turned on a royal prince, who had to satisfy his father as to his skill in archery and other accomplishments expected from a youth entering on the period of manhood, and whose marriage was to follow these tests of his prowess. The king however seated on a raised bench, played the chief part, for he alone spoke, all the rest accompanying his words with gestures. The female parts were performed by men, while the Magh women and children looked on from the verandah of an adjoining house. The scene was lit up with bonfires and bamboo-torches, and the hilarity indispensable at such representations was stimulated by the rice-brandy to which the audience was liberally treated.

The same evening we continued our journey, intending next morning to visit a Banjogi village situated on a high ground some six or seven miles from the river. Like all the roads in this district, the way followed a brook named Balangong, or, to speak more correctly, it ran along the bed of the watercourse. The season being now advanced, we were frequently overtaken by tropical downpours, which often caused dangerous freshets in these rivulets. We traversed a lovely little dell, whose exuberant vegetation seemed never to have been penetrated by a ray of sunshine, much less by a human being, so matted together were trees and bushes by the orchids and all manner of twining plants.

Loud shouts, bursting on the hushed stilness of the wilderness, drew our attention to two Banjogis provided with a basket and the familiar pouch for provender, and armed with a speer and the woodman's knife indispensable for cutting the way through these thickets. We entered into conversation with them, with a view to the purchase of these objects. I also secured one of their spears for a rupee. In about an hour the path, diverging from the brook, led along the slope of a hill to a village perched on a completely isolated crag rising abruptly on all sides, and defended by a bamboo fencing. The village guard is stationed in a small house standing somewhat in advance.

The village was called Dambaelong, and belonged to the Banjogis. It consisted of sixty stately bamboo huts scattered over the eminence. At the time of our arrival it seemed quite forsaken; and we here saw only a few old people, several watchdogs, and the omnipresent swine. We made our way to the large dwelling of the village elder, an old, one-eyed, grey-bearded tatterdemalion. Squatting on mats and rugs we meantime occupied ourselves inspecting the appearance and dress of the natives, who now began to drop in.

The men wear a single strip of cloth wound round the waist, its two long ends hanging down one in front one behind. The women are content with a short scanty blue cotton cloth scarcely reaching half way down the thigh, and fastened to the hips with brass or bronze chains. The bosom remains undraped, and the children run about in the garb of primeval innocence. Infants are attached to the back of the mother by a wrap tied across the breast, and keep this position even while the mother is at work. For cradles they use large coverlets strung like hammocks by the four ends. Here, as elsewhere whenever allowed by the natives, we rummaged eagerly about the houses, being aided partly by the authority of Mr. Jarbo, and partly by the irresistible rice-brandy. But before the inhabitants could be induced to give us a photographic sitting in a single group, Mr. Jarbo had to allay their fears by taking his place in their midst. Worn out with fatigue, we returned the same night to our boats, after wading for a long distance through the watercourse. We then pushed on up stream to the confluence of the Mongu with the Sangu, where a number of Bengali chapmen had established themselves.

At seven o'clock next morning, April 15, we started for the Mro village of Rengyoung, which lies on a ridge southwest of the confluence. For two weary hours we were fain again to plod through a channel more than knee-deep. Then we had to clamber over more small hills, their slopes soft and slippery from recent rains. At last after great efforts we reached the summit of the ridge, where at sight of us a number of maidens fetching water took sudden flight, leaving their bamboo vessels behind them. Amongst them were some graceful forms.

In other respects the men and women of Rengyoung behaved exactly like the Banjogis. We were again received by a friendly gray-beard, who appeared uncommonly susceptible to the soothing effects of the brandy bottle, and accordingly betrayed great zeal in forwarding our wishes. But as he was about to part with a pretty basket and a really exquisitely worked coverlet used as a cradle or a hammock, a young woman flew at him and with terrific yelling and sobbing tore the coverlet from his hands. This, as it appeared, was her personal property, woven by herself for her child. Thereupon ensued a distressing scene, as the government official thinking his dignity offended by the incident wanted instantly to quit the village. As this would have frustrated the object of our toilsome march, I dissuaded him with some difficulty from carrying out his resolution. Then we entered another house, whose corpulent occupant was just then busy distilling arrak. Unfortunately a thunderstorm now came on, which compelled us reluctantly to beat a hasty retreat; otherwise the effacement of all the roads by the rain would have condemned us to a several days' residence in the village. The spectacle, however, which now presented itself, was one of the most stupendous imaginable. In a few seconds the firmament became completely overcast; then the welkin towered up, looking in the gleam of the electric flashes like mighty sheaves of flame. The weird effect was heightened by the neighbouring woodlands which were now all ablaze. For the natives had fired the surrounding bamboo-clad hills, in order to clear the land for paddy-fields, and sow their rice in the ashes. Thus was mingled the crackling of the burning and crashing bamboo canes with the roaring thunder aloft, the whole producing a din like that of a neighbouring battlefield. In great haste we hurried forward in order to gain the brook before it became breast-deep. But we were presently overtaken by the storm, drenched to the skin and compelled literally to slide down the steep and miry hill-sides, walking being out of the question. Thus thoroughly exhausted we at last reached our boats, where a hot cup of tea and immediate change of clothes for the present at least warded off the consequences of our wet sliding match. The same day we reached Ruma, where we resigned ourselves to a well-earned and much desired interval of repose.

April 16 and the two following days I spent in Ruma, busy ticketting and packing up my spoils. Then began the preparations for the rest of the journey. It was extremely painful for me to have henceforth to dispense with the guidance and support of the polyglott English sergeant Stevens, whose leave of absence had now expired. In his place Mr. Jarbo gave me a Mr. Rees, besides an Arakanese familiar with English and a cook. I further engaged fifteen coolies for four annas daily hire, and in their company we penetrated as far as possible up the Sangu in five of the smallest available river craft. Each boat was propelled by three rowers, I taking my seat as a fourth in one of them, constantly on the alert to prevent such a cockle-shell from losing its balance, and without any shelter from the glowing sunshine except my double-felt Indian hat. The night I passed in a bamboo hut run up by my coolies in the village of Kolengio.

Next day I increased their number by fifteen others, hired in a Magh village. Nothwithstanding the magnificent riverain scenery the trip was rendered almost unendurable by the intense heat. I lay in my little boat as if in a coffin; for the slightest motion might have caused it to endanger our lives by capsizing. Towards the evening I again sought rest in an improvised bamboo hut; but sleep was wooed in vain. Its place was usurped by headaches and a loathing of food, sure forerunners of a severe attack of fever. Against this enemy I was unfortunately helpless, my supply of quinine, the great febrifuge, having been inadvertently sent back to Chittagong.

Before starting next day, I made a search for the stone, which according to Lewin was supposed to contain inscriptions in the enigmatic speech of an extinct people. Lewin had not himself seen the stone, and had probably been wrongly informed. At least I was unable to detect the slightest trace of an inscription. It lay in the middle of the river-bed, showing on the upper side a smooth surface, enclosed within a kind of frame, which last had doubtless suggested the idea of an inscription.

Towards four o'clock in the afternoon we landed at Meduserra, and left our boats, with the intention of crossing a triple range of hills in order to reach Dalakmey on the Koladan river in Arakan. Here we found ourselves in the very heart of the Kumi territory, one of whose villages I visited and received a very friendly reception. The men of this tribe are thickset and square built, in other respects resembling the Mros and Banjogis. The women wear a short loin-cloth reaching scarcely to the knee, and to this they add a narrow breast-cloth when anxious to appear in all their bravery. Here I again engaged twenty-nine coolies, having sent a portion of my people with the boats back to Ruma.

Unfortunately my physical state was now becoming perceptibly worse. To the ailments of head and stomach were added pains in the joints, fresh symptoms of the approaching jungle-fever. Hence I urged the men all the more eagerly forward, in order as soon as possible to reach Dalakmey, where medical aid was available.

Early on April 22 I left Meduserra with my associates. Feeling a little better I walked a part of the way, which lay at first along the bed of a brook, afterwards over hill and dale. But after a three hours' march I imprudently took a stretch on the ground to await my people, who had fallen behind with the luggage. On their arrival they found me so overcome with drowsiness, that on attempting to rise I broke down, and succumbed to a protracted fever, which brought me to the brink of the grave. My new fellow-traveller, Mr. Rees, who was well acquainted with the various agues prevalent in this district, gave me up, but nevertheless dispatched two coolies to Dalakmey to procure medical supplies from Mr. Campbell, the local English official.

Thus I lay a considerable time in the primeval forest, ill and helpless and utterly unconscious. When the coolies at last returned with the medicine, they were accompanied by eight others to lend a hand in transporting me over the intervening precipitous hills. I was placed on a specially prepared bamboo box and carried over the lofty Kantratoung range, the bearers being compelled by the roughness of the way to set me down every other moment. Had a storm overtaken us here, I would probably have been swept box and all over the precipice. With great efforts we reached the Koladan river, where in another two hours the boats brought us to Dalakmey higher up the river. I was received by Mr. Campbell in his bungalow, and to him and Mr. Rees I am indebted for my life.

On my arrival Dalakmey was in a state of great excitement, owing to a report that 500 Shindus, impelled by famine, were about to invade British territory and plunder the villages. To meet the emergency Mr. Campbell had only twenty-five frontier troops at hand, besides some Kumis armed with old guns.

As soon as I felt better I employed my Arakanese interpreter to make some ethnological collections in the surrounding Kumi villages, while attending myself to the anthropometric measurements, photographing and taking plaster casts. Mr. Campbell cooperated most obligingly in these operations, often reviving my flagging energies with champagne. One evening he persuaded the Kumis to honour me by a national dance, to which I contributed an ox with the needful supply of arrak. As the moon rose the gaily decked beast was bound to a stake and surrounded by young and old singing and dancing to the music of kettle-drums and flutes, with much tom-tomming and clapping of hands. Next morning the ox after all these honours was quickly consumed.

Unfortunately on this occasion I overtaxed my strength. The consequence was a relapse, whereupon they sent me in a boat down the river Koladan to Balakuar. Here the district commissioner Hildebrandt supplied me with medical stores through a young Englishman, at the same time inviting me to his health-resort for more careful nursing, even offering to have me conveyed thither on an elephant. However I declined the generous offer, and with my two bears purchased in Dalakmey for the Berlin zoological gardens I embarked on a steamer for Akyab and Rangoon, where for fourteen days I had still to struggle with the fever. This naturally brought to a close my excursion to the Chittagong hill tribes.

Although I cannot on the whole complain of the results of this expedition, it is evident from the above narrative that they would have been far more important but for the untimely rainy season and my attendant illness. It is also to be regretted that a large portion of my photographic sketches were dammaged by the thoughtlessness of the carrier, who through curiosity opened the box of plates, thereby exposing them to the destructive action of the light. What was rescued I have endeavoured here to reproduce partly by woodcuts, partly by the phototype process.

II. ETHNOLOGICAL.

Here Plates 1—16.

PLATE 1.

HEAD-DRESS AND CLOTHES OF THE HILL TRIBES.

Fig. 1. Shoulder-cloth, under which babies are carried. These cloths are of native cotton dyed with natural colours. The fringes are formed by winding together the ends of the cotton threads of the fabric. The piece belonged to a Kumi woman. The child sits under the cloth on the back of its mother, who twists the ends of the cloth tightly over her breast. Compare Woodthorpe, "The Lushai Expedition", p. 76.

Fig. 2. "Goungboung", turban of the Magh women. Turbans are worn by the Magh women only on festive occasions, but by the men very generally. See Lewin, "Wild Races", p. 116.

Fig. 3. Cotton wrap, under which the children are carried; see Fig. 1.

Fig. 4. Breast-cloth of the Magh women. The cloth is wrapped over the bosom under the arms, and the ends tucked away from above under the shoulders. Till the birth of their first child the Magh women keep the breast covered; see Lewin, "Wild Races", p. 192.

Fig. 5. Breast-cloth of the Magh women; see Fig. 4.

Fig. 6. Goat-hair badge worn in the ear by the Shindu chiefs; see Woodthorpe p. 76.

Fig. 7. "Goungboung", turban of the Magh women; see Fig. 2.

Fig. 8. Child's napkin. Like all the specimens of weaving figured on this plate, this napkin is made of native cotton, and dyed with simple colours. It is work by the Maghs like the Barmese Putso.

Fig. 9. Border to a garment worn by the Ka-Khyens of the Barmese highlands; of native cotton with knotted fringes. This piece is introduced for comparison with the specimens of Magh weaving.

Fig. 10. Border of a female loin-cloth; worn by the women of the Lushai and kindred tribes under the large upper dress; it reaches scarcely to the knees. Compare the explanation of Pl. 3, Fig. 4.

Figs. 11 and 12. Pouches of the Kumi men. The part embellished with fringe represents the front, the wing-like projections the reverse. These wallets, containing their pipes and tinder-boxes, as well as provisions, the men of all the hill tribes carry constantly with them attached to a simple string under the arm. Compare the pouches figured on Pl. 5 behind the skulls of fetish animals, of which the more richly ornamented belonged to the Barmese Ka-Khyens; see Hughes, "The Hill Tracts of Aracan", p. 35.

Fig. 13. Breast-cloth of the Kumi women.

Fig. 14. Loin-cloth of the Kumi men.

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PLATE 2.

HEAD-DRESS AND CLOTHES OF THE HILL TRIBES.

Fig. 1. Breast-cloth of the Kumi women. This part of the costume is placed on the chest under the outer wrap, and reaches to the knee. The appended fringes are made of wool knotted together. Like the following specimens this piece is prepared of native cotton dyed with natural colours.

Fig. 2. Cotton wrap of the Lushai chief's son. The way it is worn is shown in the illustration on Pl. 3, Fig. 1.

Fig. 3. Cotton wrap of a Magh chief.

Fig. 4. Breast-cloth of the Khyeng women with knotted cotton fringes.

Fig. 5. Breast-cloth of the Lushai women; see Fig. 1.

Fig. 6. Skirt of the Khyeng women.

Fig. 7. Breast-cloth of the Lushai women (see Fig. 1), embellished at the edge with knotted woollen balls.

Fig. 8. Breast-cloth worn by the Lushai women, ornamented with woollen fringe.

Fig. 9. Head-dress of the Lushai chief, Pakhoma; see his portrait, Pl. 3, Fig. 1. He wore this decoration as a mark of his rank in war. The central piece is formed of a head-band or hoop of bamboo strips plaited together, over which are plaited slips of red and yellow orchids with which strips of tin are intertwined. At the back of this hoop are attached right and left two fans, tied together by the fringed string hanging down in the middle. These fans consist of bamboo sticks with bright attachments. Both the attachments of the fans and the fringes of the connecting strings are formed of black cotton cords strung with pearls and finished off with tufts of pigeon's feathers as tassels. In the hoop inserted above are porcupine quills, to which are fastened the tail feathers of the palæornis tipped with small tufts of pigeon's feathers. The feathers are in their natural colours.

Fig. 10. Badge of a Kumi chief made of the tail feathers of the drongo tied together with tufts of the plumage of a species of palæornis superadded. The drongo (Edolius, Bengali: Bhîmrâj),[1]) has only two such feathers. The statement that the bird here intended has a tuft on the head, determines it as E. grandis. In the portrait of a Lushai added as a tail-piece to the description of Pl. 16, the bird flying over the palms is perhaps an Edolius after the conception of a native. If so the peculiar erect pinions would merely be an unskilful representation of the plumage in the tail. Lewin relates (Wild Races p. 218 et seq.) that during a dance of the Tipperahs, at which he assisted, a tame drongo described as a "small bird", hence doubtless of another species, flew in, and perching on the chief's turban "fluttered its wings in apparent delight at the noise". The Bengali name Bhîmrâj, "King Bhîm", has a mythical sound. But whether it refers to the famous king Bhîma of the Nala episode in the Mahâbhârata, or to some other legendary person, I have failed to determine.

Fig. 11. Badge of a Banjogi chief, formed of the tail feathers of a species of drongo bound together; see Fig. 10.

Fig. 12. Lushai wallet. Pipe, tinder-box, tabacco and victuals are always carried by the Lushai men in such a pouch. See Pl. 1, Figs. 11 and 12, and Hughes, The Hill Tracts of Aracan, p. 35.

Fig. 13. Specimen of a simple pouch, in which the Maghs carry their betel.

Fig. 14. Loin-cloth of the Kumi men.

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[1]) Determined by means of comparison with the plumes of the dried specimens in the Berlin Museum. See also Hunter p. 261.

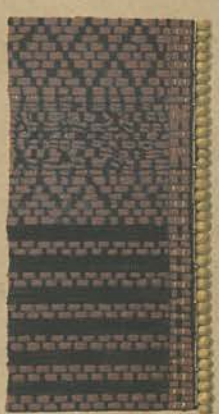

PLATE 3.

RACIAL TYPES.

Fig. 1. Portrait of the Lushai Chief, Pakhoma, from the village of Pakhoma (villages take the name of their headmen). He wears the large toga-like wrap (see Pl. 2, Fig. 2), a string of Barmese amber round his neck, and the goat's beard amulet (see Pl. 16, Fig. 14) which the Lushai never lays aside. In his ears are small silver rings, and on his right arm a silver bracelet, while the bamboo pipe is held in his left hand (see Pl. 13, Fig. 1). For the Pakhoma chief consult page 11.

Fig. 2. Group of three Lushai men and three Lushai women, taken in Damargiri. The women are clothed with loin-cloth and vest. In front of them are the large baskets, which are carried on the back by means of a band brought round the forehead. Such a band lies on top of the central basket (see Pl. 14, Figs. 2 and 7). Two of the women have pipes in their mouths, like those figured on Pl. 13, Figs. 6 and 8, and all wear pearl necklaces. In the ears of the woman to the right of the spectator large ear-plugs are thrust (compare Pl. 8, Figs. 2 a b und 15 a b). One of the men wears a turban in the style of the Bengali settled in Chittagong.

Fig. 3. Group of Lushai men and women before the Government bungalow at Damargiri, where they had come to get rice from the English officials. Most of the women are seated behind their large baskets and hold pipes to their mouths. Noteworthy are the large ear-plugs of clay or wood which they have stuck as ornaments in the widely distended lobe (see Fig. 2). The people standing on the verandah of the house are the servants of the Government bungalow.

Fig. 4. Lushai woman with her basket (see Pl. 14, Figs. 2 and 7). The band sustaining the basket is usually worm more forward round the forehead, especially when the bearer is climbing a hill with the laden basket. Here also may be observed the ear-plugs and pearl necklace. Under the large petticoat ("tabwîn", Lewin, Wild Races, p. 116) the woman wears a narrow loin-cloth reaching only to the knee (compare, for instance, Pl. 2, Fig. 1).

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Phot. Alb. Frisch Berlin

PLATE 4.

RACIAL TYPES.

Fig. 1. Portrait of a Magh woman in the service of a European at Barkhal. The silver ornament, which together with some strings of pearls is disposed round the neck, partly falling over the breast, is Bengalese workmanship, as are also the large silver Armlets, above which some narrow bangles ("bangri") have also been placed on the forearm. The costume is almost Barmese.

Fig. 2. Major Pughe at the head of a detachment of frontier troops at Rangamati. The men, consisting of Nepalese Gurkhas, Manipuri and Assamese, wear the summer uniform of white drilling, while Pughe figures in a helmet with small spike modelled on the Prussian "pickelhaube".

Fig. 3. Group of Sergeants and Corporals of the frontier guard at Rangamati in the ordinary black uniform.

Fig. 4. Sergeant of the frontier guard in the summer campaign suit, armed with the Snider rifle and the Kukri, the dreaded national weapon of the Nepalese Gurkhas hanging on the left side to the broad shoulder-belt. The wide trousers are fastened by woollen bands covering the whole calf. On his breast he wears the medal of the Lushai expedition.

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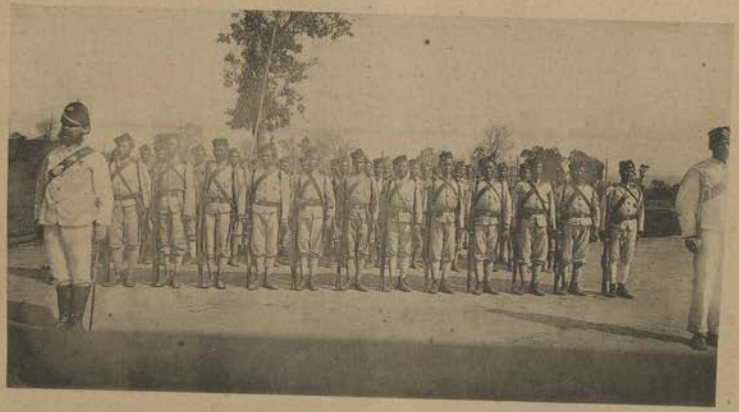

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PLATE 5.

GROUP OF ETHNOLOGICAL OBJECTS BELONGING TO THE CHITTAGONG HILL TRIBES.

On the lowest stand, to which are attached specimens of Barmese, Shan and Ka-Khyen textiles, are disposed the various animal skulls, worshipped as fetishes by the Kumi and Lushai hill tribes, and mostly figured on Pl. 16. Close by are toys (rattles) from the Chittagong District, and diverse gourd vessels (see Pl. 13, Figs. 9, 19, 20) and bamboo boxes (see Pl. 19, Figs. 7, 17).

Behind are suspended eight pouches, such as are always worn by the men of the Chittagong hill tribes, as well as by the Ka-Khyens and Shans of Barma (see Pl. 1, Figs. 11, 12). From the Ka-Khyens of Barma come the three richly ornamented, on the front side of which hang scarlet strips stitched in diverse colours and held together with pearl ornamental work.

On the next stand is exhibited the head dress of the Lushai Chief (Pl. 2, Fig. 9). Before it lies the Pacchîsî game of the Chakmâ Chief, consisting of a cruciform chess-board made of strips of cloth, and on which are placed many-coloured wooden balls.

Close by on a separate bench lie the various pipes of the hill tribes (see Pl. 13). Quite at the top are seen earthenware vessels from the Chittagong District, amongst them a large water pipe with five stems.

On the wall at the back hang Shindu and Lushai weapons (see Plates 9, 10). The large round wooden disk suspended in the centre is a dish for serving up food, from the Chittagong District.

The glass casket lying in the corner contains silver ornaments of the hill tribes and the District (see Pl. 7). Behind are figured the clothes and shoes of a Shan princess.

The back wall is formed by woven fabrics from Hindústan.

Phot. H. Rückwardt, Berlin.

PLATE 6.

GROUP OF ETHNOLOGICAL OBJECTS FROM THE COLONY AND HILL TRIBES.

Before the lowest stand hang specimens of Barmese textiles; on the stand besides oil and rice spoons of bamboo, gourds &c, are the writing tablets of the Maghs (see Pl. 8, Fig. 10), together with Barmese palm-leaf manuscripts between wooden boards and forming the sacred writings of the Maghs.

Behind are attached little caps such as are worn by the Bengali of the Chittagong District; also two of those chains made of inflexible brass tubes, which the Lushai women fasten round the waist as girdles for their upper garment (see Pl. 8, Fig. 18).

The apparatus for distilling brandy, figured separately on Pl. 22, Fig. 10, lies on the next stand, near some Magh weaving appliances, and the various implements of the hill tribes (see Pl. 11 generally).

Amongst these implements the bamboo knife firmly attached to a bamboo stock, is specially noteworthy (see Pl. 11, Fig. 9a b).

Quite at the top stand the large covered baskets of the hill tribes (see Pl. 14, Fig. 3), the portable baskets (Pl. 14, Fig. 2).

Disposed amongst them are the fishing-baskets of the Maghs plaited of bamboo in the form of bottles; also two of the small, very elegantly and firmly plaited four-legged baskets, in which the Maghs keep their balls of wools.

Before the baskets hang two ornamental pendants made of Sola-pith from the Chittagong District.

On the back wall are seen weapons of the Shindus, Lushais &c (see Pl. 9 and 10).

Phot. H. Ruckwardt, Berlin.

PLATE 7.

ORNAMENTS OF THE HILL TRIBES AND CHITTAGONG DISTRICT.

Fig. 1. Chains made of small brass links, worn by the Lushai women as girdles round the waist.

Fig. 2. Chains of small pierced silver plates worn by the Kumi women as girdles for their loin-cloths.

Fig. 3. Girdle of brass wire spirals worn by the women of the Chittagong district.

Fig. 4. Ivory ear-pin coated with lead and embellished with yellow orchid bast; worn by the Lushai men.

Fig. 5. Tiger's tooth worn as an amulet by the Lushai men; ornamented with tin and yellow orchid bast. See Woodthorpe, p. 75, where this amulet is said to be much prized. The custom of wearing tiger's teeth as charms may perhaps be connected with the superstition that there are men capable of transforming themselves into tigers. See Lewin, Exercises in the Lushai dialect, p. 83, and the legends there quoted at pp. 76 et seq. and 84 et seq.

Fig. 6. Lushai neck pendant; fang of a bamboo-rat coated with metal. The bamboo-rat is the arch-enemy of the Lushais, not only destroying the rice on their plantations, but also preying upon their granaries and leaving ruin and devastation behind them. When dead their fangs are extracted and worn as amulets. See also Hughes pp. 18, 19; Woodthorpe pp. 89, 90.

Fig. 7. "Karn-phul"; silver ear-knob of the Pankho men. The form is Indian of Bengali workmanship.

Fig. 8. Brass amulet worn by the Mro men and women.

Fig. 9. Brass amulet worn by the Kumi men and women.

Fig. 10. Little silver cylinders, which the Magh women stick in the distended ear-lobe.

Fig. 11. Leaden earrings of the Lushai men.

Fig. 12. Barmese amber beads worn as ear ornaments by the Lushai men.

Fig. 13. Silver cylinder with embossed lid, worn as an ear-ornament by the Kumi men.

Fig. 14. Silver ear-knobs of the Kumi men. In the greatly distended lobes the Kumi women wear a roll of some textile fabric or a wooden cylinder.

Fig. 15. Silver ornament worn in the cartilage of the nose by the Bengali girls of the Chittagong district. A small wire hoop connecting both ends and serving to fasten it, has been lost.

Fig. 16. Necklet of the Lushai women. The strands are embellished in the middle with Barmese amber beads with small glass rods inserted between. To either side are attached black, madder-red and white strings.

Fig. 17. Brass hair-pin of the Banjogi men.

Fig. 18. Brass hair-pin of the Lushai men.

Fig. 19. Brass hair-pin of the Lushai women with fringe of grey-yellow beads. The ends of the strings and the fringe are beaded.

Fig. 20. Ivory hair-pin of the Lushai men, embellished with concentric rings in intaglio.

Fig. 21. Brass hair-pin of the Lushai men.

Fig. 22. Brass hair-pin of the Kumi men.

Fig. 23. Necklace of the Lushai women composed of a row of amber-coloured and two light blue glass beads.

Fig. 24. Necklet of the Lushai women; the bright blue strands are gathered together with single red and white beads.

Fig. 25. Silver ear-plugs of the Lushai men. See Fig. 14.

Fig. 26. Portion of a silver neck ornament worn by the Bengali women in Chittagong. Several of such pendants are strung together. The form is Indian.

Fig. 27. Silver earring of the Chakmâ women.

Fig. 28. Silver armlet with a silver plaque of fine filigree work, from the Chittagong district. Anna coins soldered on serve as a finish to the central ornamental piece, and also on one side as a clasp.

Fig. 29ab. Two silver ear tubes of the Lushais.

Fig. 30. Brass bracelet worn by the Bengali children in the Chittagong district.

Fig. 31ab. Silver ear ornament of the Kumi men.

Fig. 32ab. Silver ear ornament of the Kumi men.

Fig. 33. Silver earrings of the Mro men.

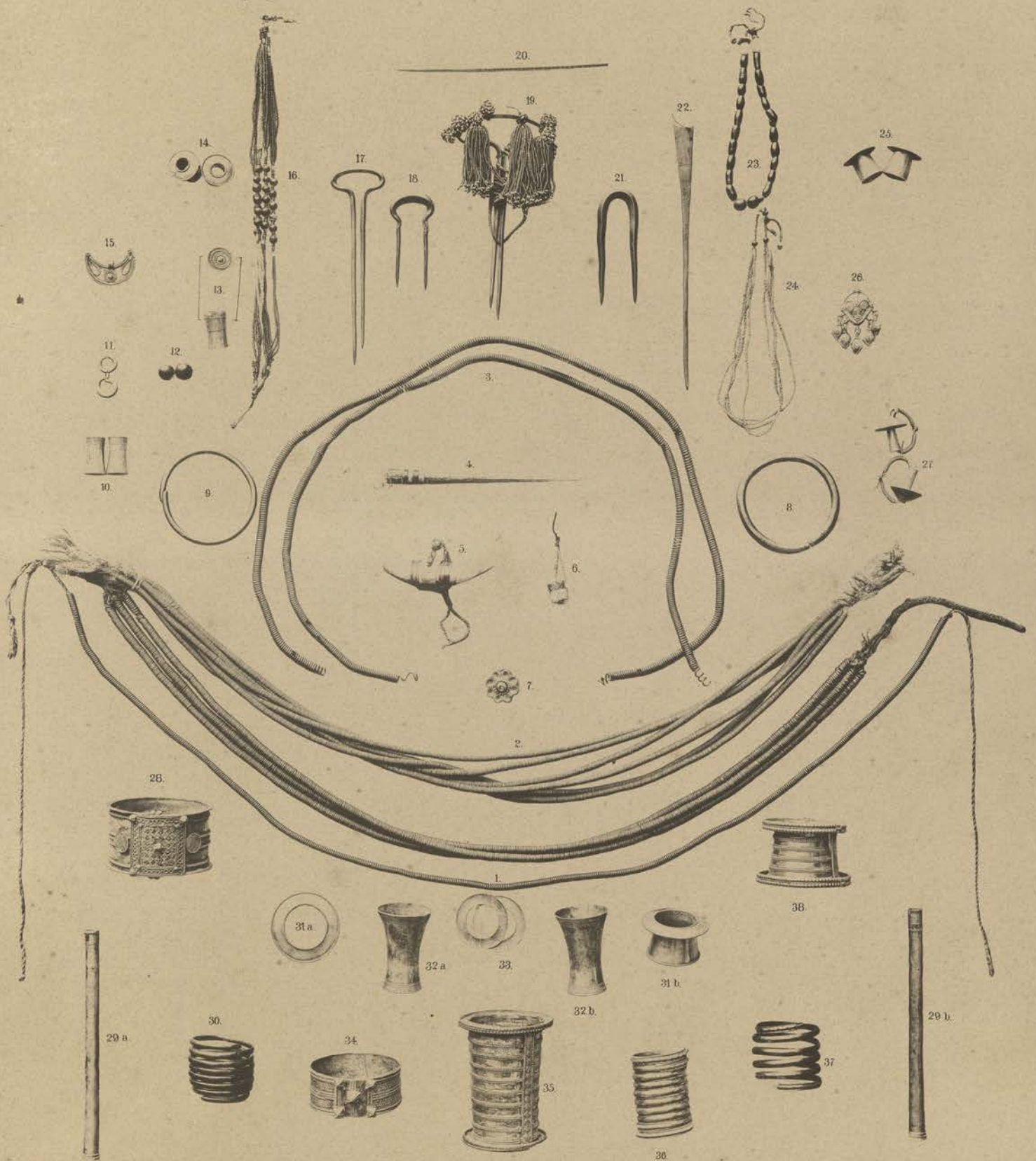
Fig. 34. Silver bracelet of the Tipperah, Magh or Chakmâ women; Bengali workmanship.

Fig. 35. Silver armlet of the Maghs.

Fig. 36. Silver bangle worn by the Magh, Chakmâ and Tipperah women; made by the Bengali of Rangamati.

Fig. 37. Brass bangle of the Maghs.

Fig. 38. Silver armlet worn by a Bengali Nach girl in the Chittagong district.



Phot. Alb. Frisch, Berlin.

PLATE 8.

OBJECTS FOR PERSONAL USE AND ORNAMENT OF THE HILL TRIBES; WRITING MATERIALS.

Fig. 1. Iron hair-pin worn by the Lushai men.

Figs. 2 a b. Ear-plugs of white baked clay, worn in the widely distended lobes by the Lushai women. See Woodthorpe p. 76.

Fig. 3. Fruit of a species of thistle used as a brush by the Lushais.

Fig. 4. Bamboo comb of the Mros.

Fig. 5. Comb of the Lushai men. The teeth are of bamboo splinters fastened with string to a wooden back. Dalton (Ethnology of Bengal p. 47) mentions that the combs, especially those presented as wedding gifts to married couples, are sacred objects, the loss of which is regarded as a great misfortune. "When a man dies, his comb is buried with him, and his near relations break their combs and must roam with dishevelled hair for a few days before they renew them." (ib.) Lewin (Exercises in the Lushai Dialect pp. 88, 89), tells the tale of Kíngóri, a runaway belle, who has lost her comb, and is recognised as the legitimate wife of the man who restores it. Dalton's statement is doubtless connected with this idea.

Fig. 6. Bamboo-ear-plugs of the Pankho women.

Fig. 7. Leaden bracelet of the Lushais.

Fig. 8. Comb of the Banjogi men, made of bamboo splinters fastened together with strings and gum. Above it is fixed a brass roof-shaped handle.

Fig. 9. Iron hair-pin worn by the Lushai men.

Fig. 10. Bamboo ear-plugs of the Tipperahs.

Fig. 11. Comb of the Shindu men, made of bamboo and wood.

Figs. 12, 13. Ivory ear-plugs of distinguished Lushai women. See Fig. 2 a b.

Fig. 14. Shell neck ornaments worn by the Lushai women.

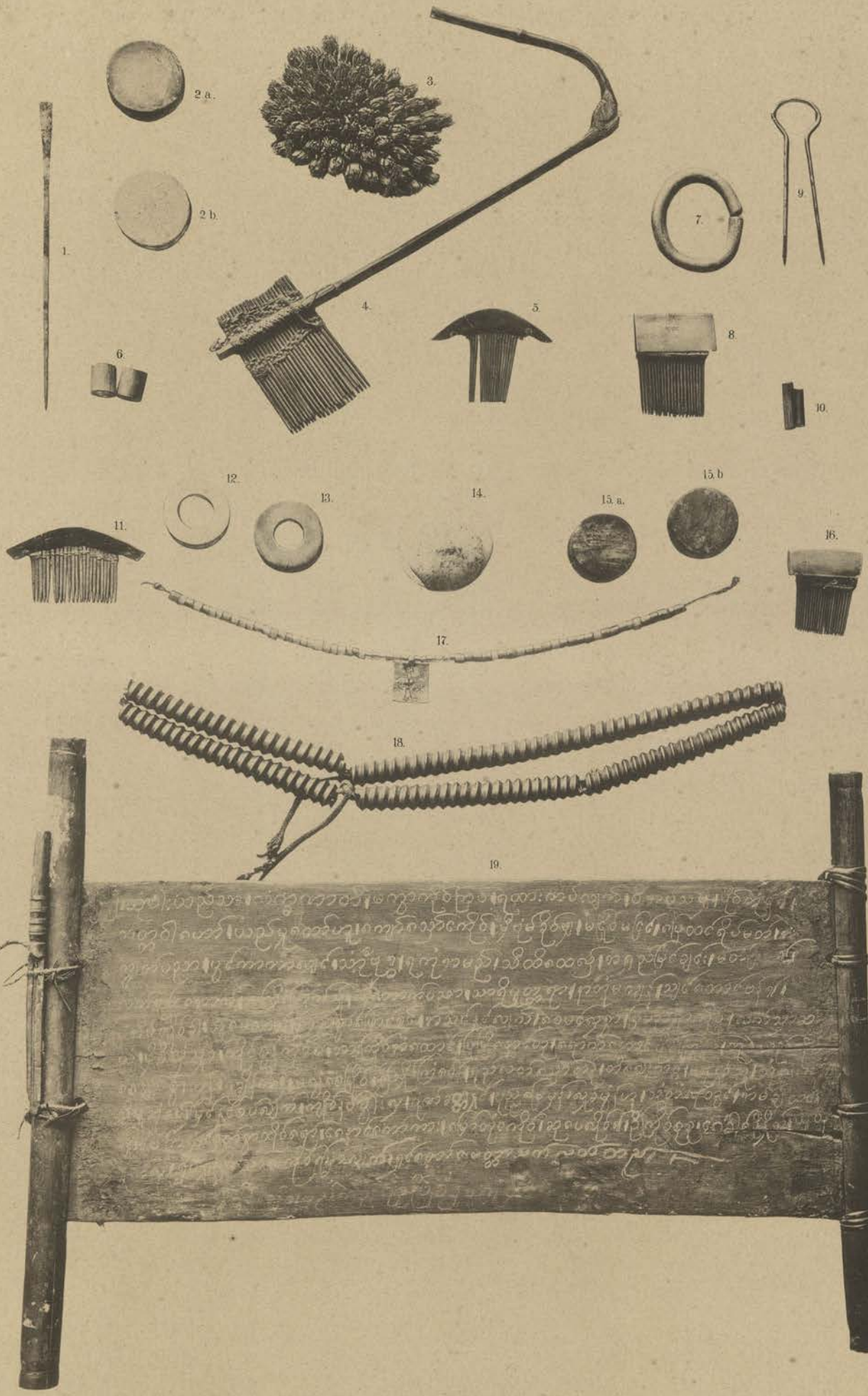
Figs. 15 a b. Wooden ear-plugs of the Lushai women. The Lushai men wear silver ear ornaments, the women large wooden plugs or rolls of cloth.

Fig. 16. Comb of the Lushai men. The teeth are of bamboo splinters fastened with strings and gum to an ivory handle.

Fig. 17. Necklet of bright blue and white glass beads with silver pendant on which is carved a human figure; worn by a Lushai woman.

Fig. 18. Chain made of five spiral-shaped brass rolls, worn by the Lushai women as a girdle round the waist. It should be noted that the several sections of the chain are not pliant; hence the body must adapt itself to them.

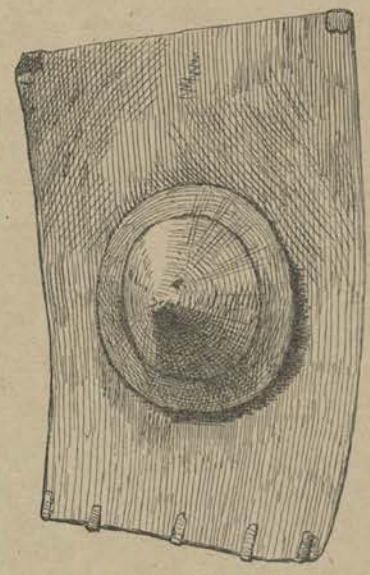
Fig. 19. Wooden writing tablet coated with black, on which they write with steatite (soap-stone) pencils; in use amongst the Maghs from Arakan. The tracings here figured are in the Barmese characters common to the Maghs, and appear to contain a sacred text, the names of some of Buddha's apostles (for instance Sâriputto in the middle of the third line) being clearly legible.



Phot. Alb. Frisch Berlin.

PLATE 9.

WEAPONS OF THE HILL TRIBES.



Shield of Gayâl hide with bronze Boss; see Note to Fig. 6.

Fig. 1. Long sword of the Maghs; hilt mounted in brass; blade of wrought iron; Length 84 cm.

Figs. 2ab. a. Bamboo wickerwork quiver with arrows, used by the Lushais; b. Wooden arrow without a separate head; feathered with plumes of a pigeon.

Fig. 3. Lushai Powder-flask made of the horn of a Gayâl (Metua). The Lushais now prepare their own powder, whereas formerly they imported it from Barma, Kachar or the Chittagong District (see Lewin, Wild Races, p. 270; Woodthorpe p. 79).

Figs. 4ab. Shindu sword; a. the brass hilt embellished with a tuft of red goat's hair; b. Sheath of bamboo wickerwork covered with the skin of a wild cat. The weapon belonged to a Chief.

Fig. 5. Simple Shindu sword with brass hilt.

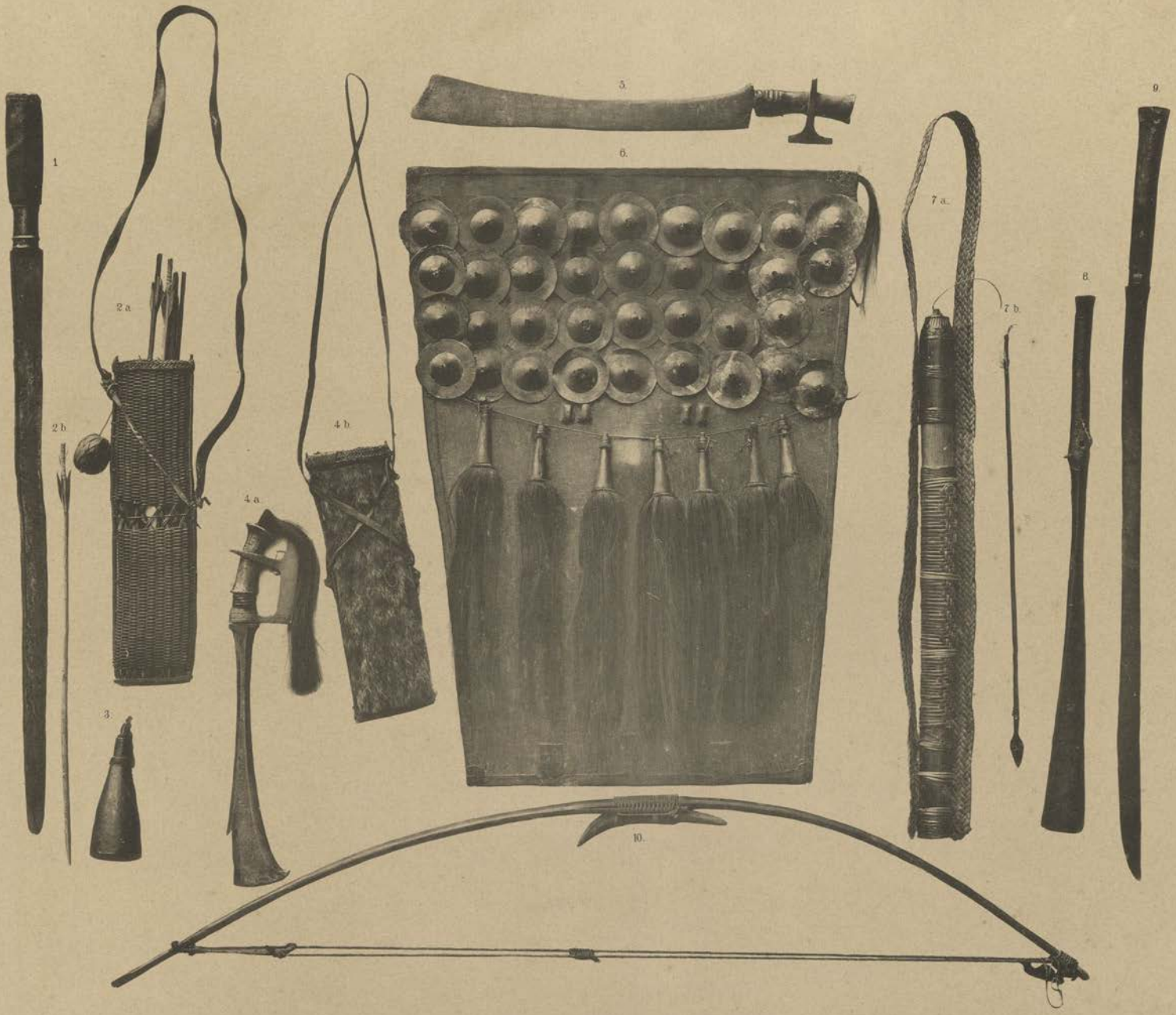
Fig. 6. Shindu shield of gayâl hide. The numerous brass bosses and long tufts of red goat's hair indicate that the bearer is a Chief of the first rank. The shield of the second rank has only a single large metal boss in the centre (see the vignette above and the vignette on the Text of Pl. 10); that of the third rank nothing but goat-hair tufts at the upper corners (see Pl. 10, Fig. 4 and Hughes, The Hill-Tracts of Aracan p. 40).

Figs. 7ab. Shindu quiver with arrows; a. the quiver is of wood dyed black bound round with bamboo cane and attached to a plaited bamboo belt. The cover is carved of wood and with a string fastened in the middle to the quiver. It is closed with a projecting portion fitting into the tube; b. The arrows are of wood with iron head and feathered with pigeon's plumes.

Fig. 8. Shindu sword, made entirely of the barrel of an old gun. The barrel forms the hilt, a small aperture in which served as the touch-hole. Two adjoining ears or loops served to pass through the string for hanging it up, or perhaps also for taking aim.

Fig. 9. Long sword of the Maghs (see Fig. 1), Length 91 cm.

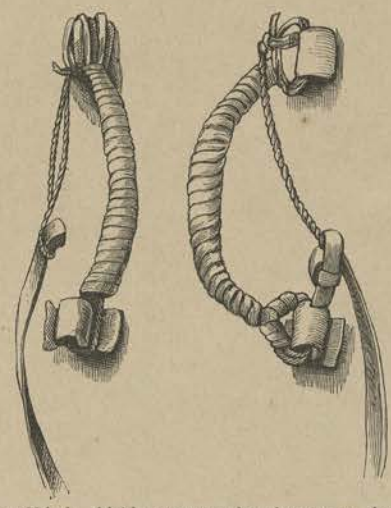
Fig. 10. Bow for discharging clay balls, used by the Lushais. The ball is placed in the small net in the middle of the double string and shot off like an arrow. The crescent-shaped wooden piece fastened with strips of bamboo serves as a handle.



Phot. Alb. Frisch Berlin.

PLATE 10.

WEAPONS OF THE HILL TRIBES.



Handle of a Shindu shield; compare the vignette on the text of Pl. 9.

Fig. 1. Banjogi spear; shaft of wood, head and butt of wrought iron; length: 1,35 cm.

Fig. 2. Magh spear with wooden shaft; head and butt of wrought iron; length: 1,33 cm.

Fig. 3. Lushai spear with short wooden shaft, long head showing a ridge in the centre, and very long three-cornered butt; length: 1,33 cm.

Fig. 4. Shield of gayâl hide with black goat-hair tufts at the upper corners; shield of the third rank. See Pl. 9, Fig. 6.

Fig. 5. Banjogi spear forged entirely of iron. In accordance with the nature of the material the shaft is scarcely indicated at all, and the very long three-cornered spiked butt-end (σαυρωτήρ) fits directly to the head, which to suggest a shaft shows a considerable extension backwards; length: 1,53 cm.

Fig. 6. Kumi spear with long wooden shaft; wrought iron head and butt. The head shows no ridge; length: 1,67 cm. See Hughes p. 40.

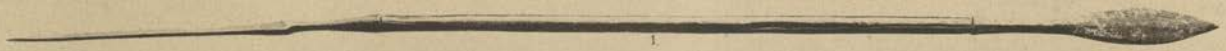
Fig. 7. Lushai quiver with lid, which is fastened with a string in the centre to the bearing strap. The quiver is of wood dyed black. To the strap is suspended the finger-guard made of variegated wood. This guard, when shooting, is placed round the thumb bent backwards of the left hand which holds the bow, thus protecting it from the recoil of the released string.

Fig. 8. Lushai sword-knife of wrought iron with wooden hilt.

Fig. 9. Lushai powder-flask made of the horn of a gayâl (see Pl. 9, Fig. 3).

Fig. 10. Bambu quiver, with rich carving which unfortunately has completely disappeared in the photograph. An idea of the character of the carving is given by the vignette forming a tail-piece to the text of Pl. 16.

All the objects on Pl. 10 are figured to a scale of one fifth of the natural size.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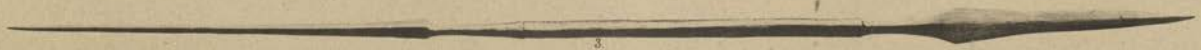
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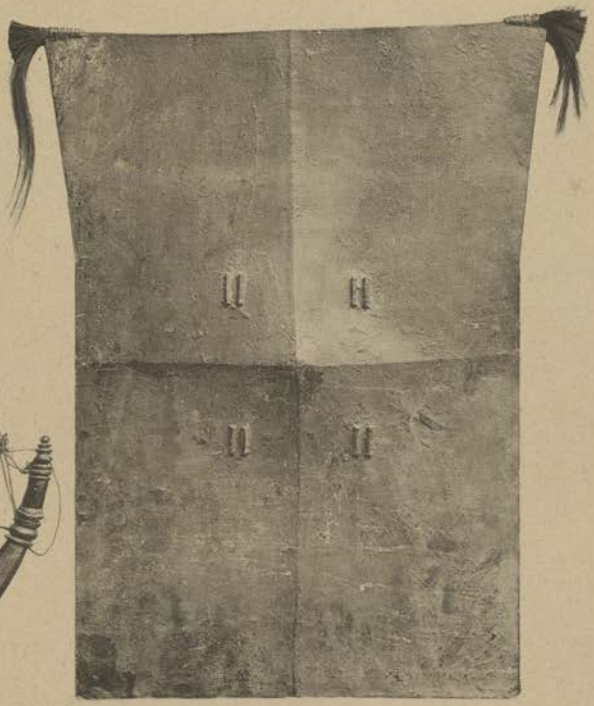

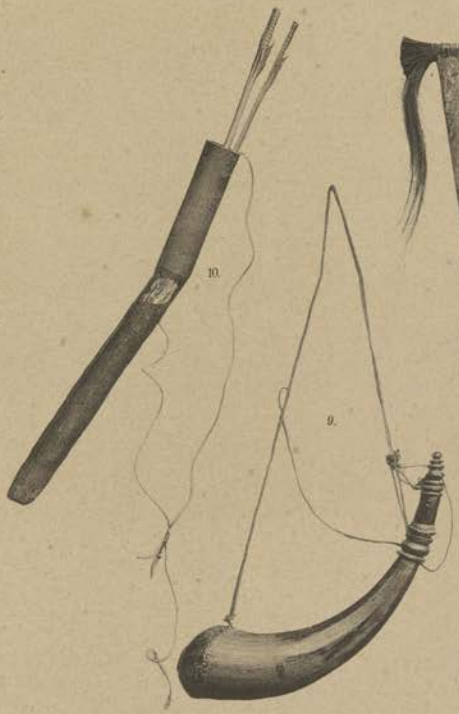
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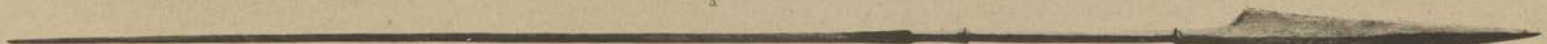
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Phot. Alb. Frisch Berlin.

PLATE 11.

TOOLS OF THE HILL TRIBES AND DISTRICT CHITTAGONG.

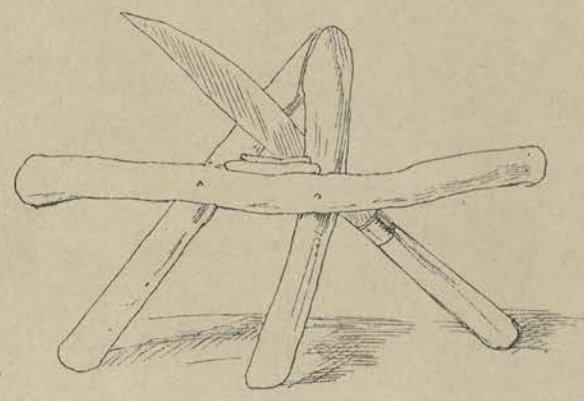

Fig. 1. "Korali", or axe of the Maghs; wooden handle with movable blade. When the iron is fixed like a hoe to the shaft, the implement serves for digging out canoes. But when attached like a hatchet, as in the illustration, it is used for felling and splitting trees.

Figs. 2, 3. "Dâ", two wrought iron knives in wooden handles bound with bamboo withes; used by the Lushais. The term dâ Hughes (p. 41) tells us is not to be confused with dâo (Fig. 17).

Fig. 4. Sickle of the Maghs; blade of wrought iron, handle of bamboo.

Fig. 5. "Erd-dâo", or hand-plough of the Mros; wooden shaft, wrought iron share.

Fig. 6. Large Lushai knife (compare Figs. 2 and 3).

Fig. 7. Hatchet for excavating canoes (kundâ) used by the Chakmâs (cf. Fig. 1).

Fig. 8. Sledge-hammer of the Maghs or Tipperahs.

Figs. 9ab. Bamboo frame with knife for splitting bamboos. The knife is placed in the frame edge upwards in the triangular space above the cross-piece, so that the handle resting on the ground forms a steady tripod with the two-legged frame inclined obliquely backwards. The workman is seated above the handle, his hams pressing the projecting ends of the cross-beam, and thus works away with the bamboo poles on the blade. See the vignette above.

Figs. 10ab. Lushai knife with accompanying wooden sheath.

Fig. 11. "Nai", or wrought iron anvil of the Maghs.

Figs. 12ab. Lushai knife with accompanying wooden sheath.

Fig. 13. "Korali", or timber axe of the Tipperahs, procured in Rangamati.

Fig. 14. Three-pronged fish-hook used at low water in the Chittagong district.

Fig. 15. Mattock for uprooting wild potatoes; the flat wrought iron blade is fixed to a natural bamboo joint, which is then inserted in another piece of bamboo. Used by the Lushais.

Fig. 16. Simple hoe of the Mros, bamboo handle in which is set a flat wrought iron blade.

Fig. 17. "Dâo". This universal weapon, which is used also in field operations, is common to all the hill peoples. The wide blade in often finished off with a decided angle above, but always with a point projecting forwards. This side alone is edged. The point serves for striking, the broad side for digging. This implement plays a leading part at the so-called "jûm", when the hill-side has to be cleared of its bamboo jungle and the land reclaimed for cultivation. The bamboo canes are separately felled with the dâo, and then fired when dry, after which the seed is sown in the ashes of the forest vegetation burnt deep into the ground (see Lewin quoted by Hunter p. 72 et seq.). "With both the fighting and the ordinary dâo one can make but two cuts; one from the right shoulder downwards to the left, one from the left foot upwards to the right .... Any attempt to cut in a way contrary to those mentioned causes the dâo to turn in the hand on the striker, and I have seen some bad wounds inflicted in this manner .... The ordinary hill dâo is generally stuck naked into the waistbands on the right hip, but the fighting dâo is provided with a scabbard, and worn at the waist. The dâo to a hill man is a possession of great price. It is literally the bread winner; with this he cuts his joom and builds his house; ..... he fashions the women's weaving tools; with the dâo he fines off his boat; he notches a stair in the steep hill side leading to his joom; and to the dâo he frequently owes his life in defending himself from the attacks of wild animals" (Lewin, The Hill Tracts of Chittagong p. 12 note, and Wild Races of South Eastern India p. 35 note). But the dâo serves also as a remedy in case of cholic, when the heated blade is placed on the stomach of the patient swathed in a wet cloth (see Hunter p. 92). Oaths are taken on the dâo, as on some other indispensable objects (Hunter p. 53).

Fig. 18. Sledge-hammer (in Bengali "Dohatha", or two-handed), used by the Khyoungthâs.

Fig. 19. Knife of a Magh; ivory handle, brass mounting, wrought iron blade.

Fig. 20. Plane of the Rangaṃati Maghs. On the wrought iron and somewhat curved blade another is firmly welded crosswise, its broad lower end serving to shave off the wooden knots. Bamboo handle.

All objects figured on Plate 11 are represented to a scale of one-fourth of the natural size.

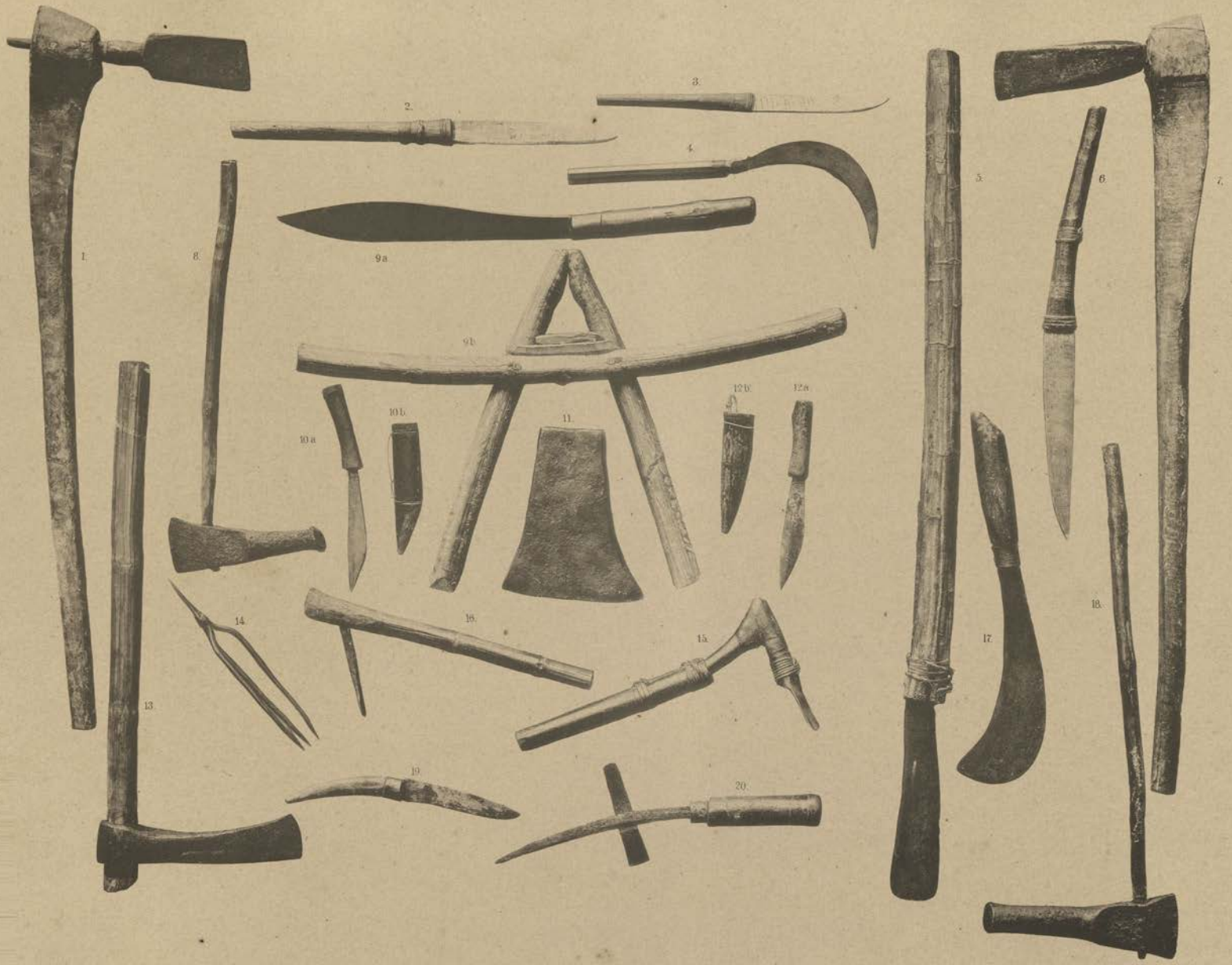
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PLATE 12.

INDUSTRIAL AND HOUSEHOLD UTENSILS OF THE HILL TRIBES.

Weaver's loom in the village of Pakhoma. The loom is made of bamboo with the dâo (Plate 11, Fig, 17); spindle and weft-boards of wood. The loom had been mounted on bamboo stakes in the middle of the village roadway. The woman is drawing the web towards her by means of a band passed round her back, at the same time plying the spindle and shuttle.

Fig. 1. Weaver's loom of the Maghs made of bamboo shafts. The large cross-beam, on which are placed the still loose woollen skeins, is fastened to two fixed poles by means of notches cut out for the purpose, or else attached by cordage to strings hanging from the roof or other parts of the house. The fine woollen fabric begun to be woven is dark blue and madder red with white stripes running through. The notched bamboo pole to the right serves to fasten the back-strap Fig. 2, suspended on the other side. In the space between the back-strap and cross-beam is seated the woman at work, drawing the web towards her.

Fig. 2. Back-strap used by the Magh and Mro women when working at the loom. Here it is suspended to the bamboo pole to the right in Fig. 1.

Fig. 3. Wooden shuttle of the Maghs.

Fig. 4. Yarn-holder of the Lushais, made of bamboo splinters.

Fig. 5. Lushai spinning-wheel, made of bamboo splinters; the whole fixed to a bamboo shaft, which is inserted in a heavy, massive pyramid-shaped wooden pedestal.

Fig. 6. Spindle of the Mros with white cotton.

Fig. 7. Spindle of the Maghs with dark red cotton.

Fig. 8. Small gourd plaited over with strips of reed; used by the Lushais for keeping seeds.

Fig. 9. Wooden bolster of the Banjogis.

Fig. 10. Apparatus of the Chakmâs for making rice brandy (arrak). *a* large water-vessel for generating the steam, which distills the rice cakes in the gourd *b*. From rice, the wood of the Bema and Chek plants, and a kind of white earth cakes are kneaded, which in the distillation pass through the conducting tube *c* to the condenser *d* which is also made of a gourd; *e* three-cornered piece of matting, on which the condenser is placed to be cooled with water; *f* cooling vessel holding water for cooling the condenser; *g* coconut ladle with bamboo handle; *h* Bema and Chek wood, which is ground down and mixed with the rice cakes.

Fig. 11. Fire-fanner of feathers bound together with bamboo withes and inserted in a handle of the same material.

All objects figured on Plate 12 are represented to a scale of one-sixth of the natural size.

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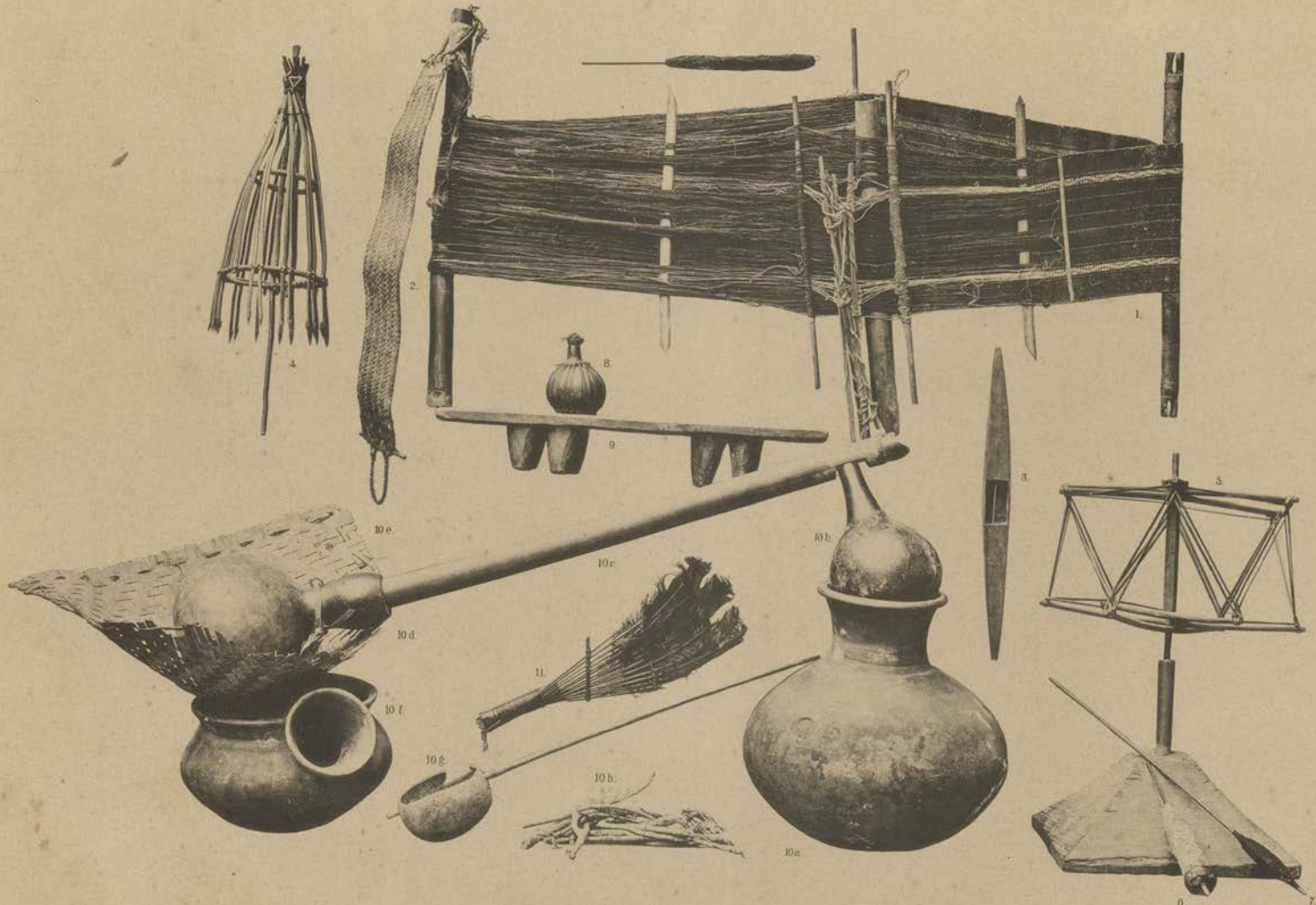


Phot. Alb. Frisch Berlin.

PLATE 13.

PIPES, SPOONS AND OIL VESSELS.

Fig. 1. "Vaibel", or pipe of the Lushai men. A bamboo joint forms the bowl, which is lined with tin and mounted in brass. A piece of the root projecting backwards has been worked into a handle for the pipe.

Fig. 2. Pipe of the Lushai men; bamboo lined with tin. Here also a bit of the root growing backwards has been smoothened and mounted with tin as a handle, with which to hold the pipe when aglow. (See Woodthorpe p. 77.)

Fig. 3. Pipe of the Lushai men, made of a bamboo knot forming the bowl.

Fig. 4. Lushai spoon, of bamboo, used for various purposes and very easily prepared. A piece of bamboo about a foot long is cut off and carved like a goose-quill, leaving a long stem. (Woodthorpe p. 92.)

Fig. 5. Bamboo pipe of the Shindu men.

Fig. 6. "Tibúr", or pipe of the Lushai women. The bowl is of clay with impressed ornamental lines. By means of a thin reed the head is fixed to a wooden knot, a side sprout of which serves as a setting for the iron tube ornamented with fine wire-work. Under the above mentioned wooden portion, which is hollowed out, there is attached the bow-shaped knot of a bamboo. This bamboo, which is carved with elegant ornaments, forms with the wooden head-piece the receptacle for water, into which the nicotine flows from the bowl. A brass lid for the bowl and a couple of brass pins for cleaning the pipe are suspended to the stem. (Woodthorpe p. 77.)

Fig. 7. Wooden snuff-box of the Lushais; half of the box and the whole of the lid lacquered in black.

Fig. 8. Pipe of the Lushai women (compare Fig. 6 and Dalton, Ethnology of Bengal, Pl. XXI). Here also the little bamboo bowl is prettily ornamented.

Fig. 9. Lushai oil ladle, made of a hollow gourd.

Fig. 10. Lushai rice ladle, carved out of wood.

Fig. 11. Pipe of the Banjogi women; the bowl is of clay, the rest of bamboo.

Fig. 12. Gourd with nicotine from a women's pipe (compare Figs. 6, 8, 11, 18). The men collect in these gourds the tobacco juice from the little bamboo receptacles forming the lower compartment of the women's pipes, and every now and then sip it with gusto, keeping the nicotine for some time in their mouth and then spitting in out. This liquor is regarded as a great delicacy, and when a Lushai meets a friend he politely offers him some. (Woodthorpe p. 77).

Fig. 13. Pipe of a Chakmâ; bowl of red clay, stem of bamboo, the suspended chains of brass.

Fig. 14. Vessel with tobacco juice (cf. Fig. 12).

Fig. 15. Steel for striking fire; Lushai.

Fig. 16. Wooden tinder-box; Lushai.

Fig. 17. Leather pouch for flint and steel; Lushai.

Fig. 18. Pipe of the Banjogi women. Head of clay with engraved ornaments; mouthpiece of iron with fine wire-work; receptacle for the tobacco-juice of bamboo, on which stands a hollow wooden knot, in which the bowl is fixed with a tube. From the tube hangs a brass pin for cleaning it.

Fig. 19. Lushai spoon made of a gourd, for drawing water.

Fig. 20. Banjogi drinking-gourd.

Fig. 21. Lushai rice spoon, made of a large gourd hollowed out.

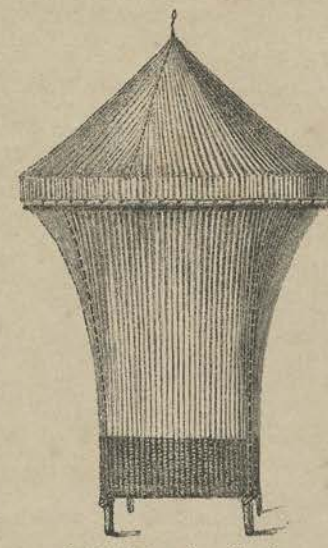
Fig. 22. Pipe of the Chakmâ women. Bowl of red clay; stem of iron; ornamental chain and cleaning pin of brass.

All the objects figured on Plate 13 are one-fourth of the natural size.

Phot. Alb. Frisch Berlin.

PLATE 14.

WICKERWORK OF THE HILL TRIBES.



Lushai basket (see Fig. 3).

Fig. 1. Large hat made of wickerwork and leaves, worn by the Maghs as a protection against sun and rain. The hollow part is placed over the head.

Fig. 2. Lushai basket for carrying cotton; an exceptionally fine and firm specimen of wickerwork. These large baskets are carried on the back, suspended from the forehead by a reed band, which is passed round the basket and occasionally attached to the bearer's shoulders by the extremities of a yoke.

Fig. 3. Large basket with cover, for keeping clothes &c. The Lushais keep their more valued effects in such baskets, which are always set up in the interior of the houses. They are of unusually strong and waterproof wickerwork, the lower portion being often ornamented with interlaced reedwork of a darker colour, or with yellow orchid bast.

Fig. 4. Wear-basket of the Khyoungthas, made of bambu splinters.

Fig. 5. Shindu basket plaited with rushes.

Fig. 6. Seed-basket of the Mros of excellent workmanship.

Fig. 7. Rush-basket of the Maghs used for fishing.

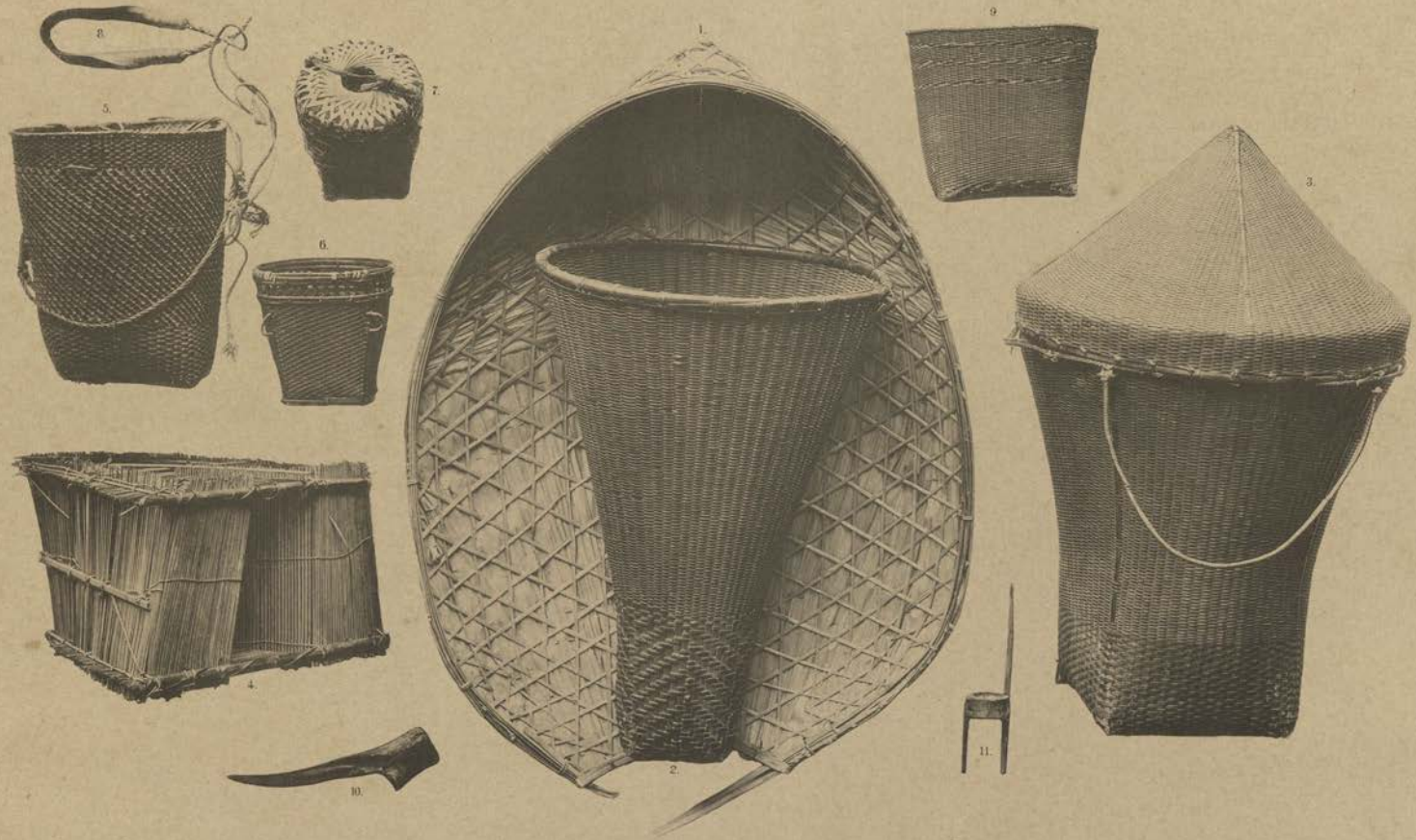
Fig. 8. Bearing string of grass-work, for carrying the large baskets on the back. The wide central part is passed round the forehead, and the ends fastened to the sides of the basket (see Pl. 3, Fig. 4). Obtained from a Banjogi woman in the village of Dambaelong.

Fig. 9. Vegetable basket of the Mros; of fine rushwork, decorated at the edge with interlaced yellow orchid bast.

Fig. 10. Pointed bone used by the Maghs for drilling holes in their basket-work.

Fig. 11. Bamboo hook used by the Lushais and Banjogis as a prop in carrying large baskets.

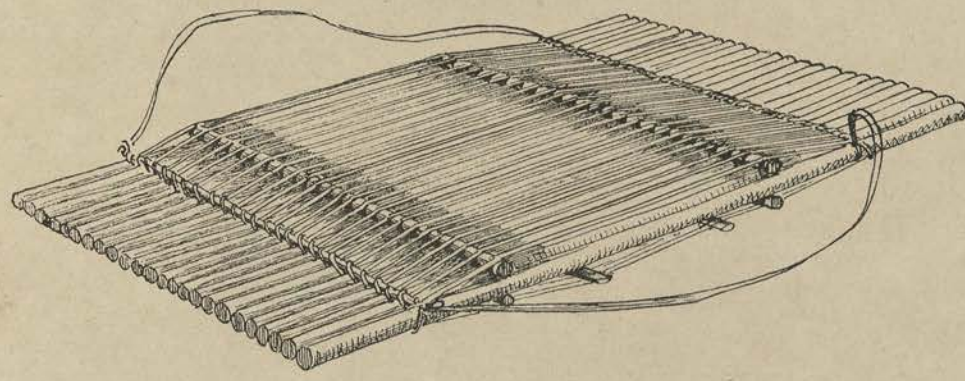
Figs. 10 and 11 are a fourth, all the rest a sixth of the natural size.



Phot. Alb. Frisch Berlin

PLATE 15.

MUSICAL INSTRUMENTS OF THE HILL TRIBES.



Bamboo guitar made of very thin reeds bound together with other pieces of reed, over which are plaited split slips of reed. Between these connecting strips the several reeds are peeled, the parings being then raised by obliquely inserted reeds and strung like chords.

Fig. 1. Unfinished musical instrument, carved out of wood; handle a bird motive. This instrument was obtained from the Tipperahs, but is of Barmese workmanship.

Fig. 2. Musical instrument of the Mrungs; made of a hollowed gourd in which are inserted long and short reed pipes, each with a single note. It is played at dances, and although monotonous its music is not unharmonious.

Figs. 3, 4. Reed flutes of the Chakmâs.

Fig. 5. Wooden drum of the Lushais; the skin is made of the hide of Cervus muntyak.

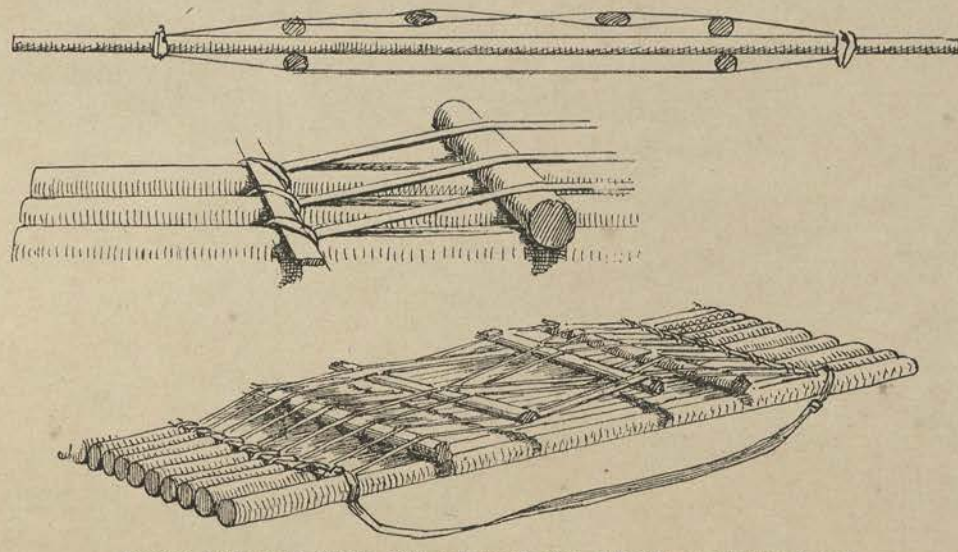
Fig. 6. Musical instrument of the Kumis; made of a large gourd and a reed pipe five feet long.

Fig. 7. Kettle-drum of the Tipperahs, made of wood and deer-skin; used at dances on festive occasions.

Fig. 8. Musical instrument (Monochord) of the Pankhos; made of a large hollowed gourd and a slip of bamboo to which the string is secured; is played like a guitar.

Fig. 9. Three-stringed kit made of a single piece of wood. The sound-hole is scooped out, and pasted over with several pieces of paper; procured from the Chakmâs of the Karnaphuli river, but Bengalese workmanship.

All the musical instruments figured on Plate 15 are drawn to a scale of one-fifth of the natural size.



Bamboo guitar of the Maghs. Side and reverse view of the instrument above figured.

Fig. 11. Skull of a bear; Lushai.

Figs. 12, 12a, 13, 13a. Lushai amulet-holders made of a bamboo slip embellished with ornamental scratchings and representations of plants and animals. See the Vignette below.

Figs. 12b, 13b. Are specimens of the extremely elegant ornaments which are scratched on the bamboo vessels.

Fig. 14. Goat's beard, which, fastened with a string, forms the chief amulet of a Lushai, and is never laid aside by him.

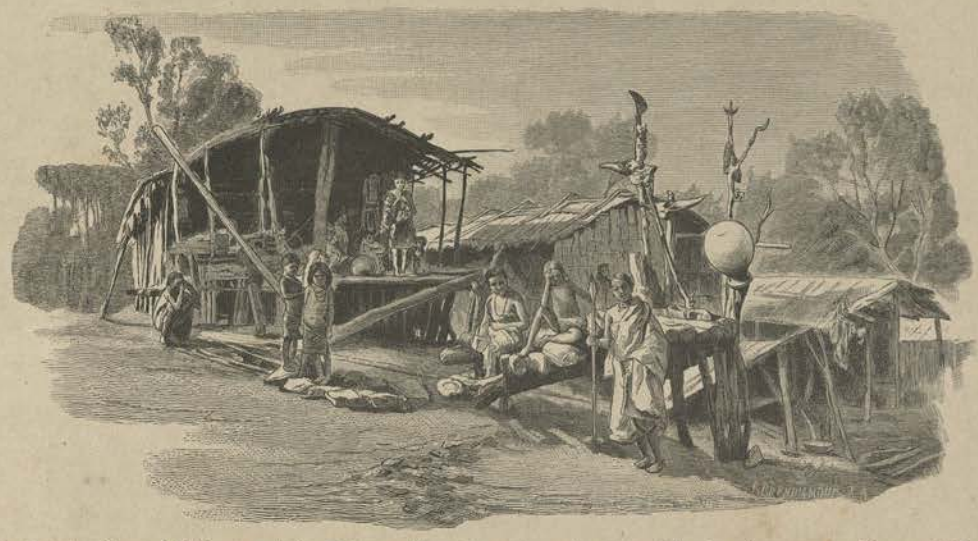
Fig. 15. Ornamental portion of the bamboo quiver represented on Plate 10, Fig. 10, for comparison with the ornaments of the amulet-cases reproduced on Plate 16, Fig. 12, 13.

A Lushai Drawing; compare with Figs. 12, 13.

Phot. Alb. Frisch Berlin.

PLATE 16.

ORNAMENTS OF TOMBS AND AMULETS OF THE HILL TRIBES.



Burial-place in the Lushai village of Pakhoma; skulls of the gayâl are fastened on the posts of bamboo (see note to Fig. 2 and Hughes p. 23, Woodthorpe p. 180). The pot stuck on the posts seems to be intended as a solace for the prisoners of war, who are addicted to the deceased by making use of it in drinking.

Fig. 1. Earthenware plate, painted with Arabic inscriptions; comes from the sick room of a Mohammedan soldier at Rangamati. Such plates the Mohammedans of the Chittagong District hang up in the rooms of sick people in order to scare away the jins or demons who cause the ailments.

Fig. 2. Skull of a musk-deer. The Lushais set up the skulls of animals on bamboo stakes before their houses, or on the graves. The quarry accompanies the dead to the other world and is evermore subjected to him (see Woodthorpe p. 180 und Figs. 3—5, 9—11).

Fig. 3. Skull of the Cervus muntyak; Lushai.

Fig. 4. An ape's skull; Lushai.

Fig. 5. Skull of a Marabu; Lushai.

Fig. 6. Charm set up outside the Lushai villages, as a protection against sickness. It is an eye-shaped amulet formed of a bamboo crosslet by winding round it black, red and white cotton thread.

Fig. 7. Talisman of bamboo slips, to which are attached little leguminous pods with white woollen thread; set up before the village to protect it from sickness. On the subject of woollen thread used as a charm against misfortune see Lewin quoted by Hunter, p. 52—53.

Fig. 8. Skull of a wild-boar; Banjogi.

Figs. 9, 10. Wild-boar skulls; Lushai.

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III. ANTHROPOLOGICAL.

Here Plates 17—20.

TABLES I. AND II.

Table I. Measurements.

No.	Name	Place of Measurement	Tribe	Age	Colour according to the Paris scale	Quality and colour of the hair	Colour of Iris (Paris scale)	Full Height	Grande Envergure	Shoulder Breadth	Pelvis Breadth	Length: Trunk	Length: Upper Arm	Length: Fore Arm	Length: Hand	Length: Thigh	Length: Fore leg	Foot: 1. Height	Foot: 2. Length	Distance from Middle Finger to Knee-cap	Compass: of Neck	Compass: round the Shoulders	Compass: under the Arms
								1	2	3	4	5	6	7	8	9	10	11		12	13	14	15
1	Koisoka ♂	from the Sirtay-Hill at Damargiri	Tangloa-Lushai (or Kuki)	60(?)	29	sleek tresses	3	170	168	42	34	65	37	26	25	55	46,5	7,0	27	15,5	35,5	98	87
2	Lâla ♂	» » »	»	22	37	black long sleek	2	166	171	44,5	29,5	65	35,5	27,5	19	48,5	45,4	7	24,7	12	32,5	102	83
3	Wânûna, Chief ♂	» » »	»	32	29	sleek black	1	162	165	39	31	59,4	30,9	26	20,1	45,5	43,5	7	26	9,5	33,5	96	84
4	Çankhlâl ♂	Barkhal on the Karnaphuli river	Pankho	35	43	black tresses	2	156	157	38	25,8	61,3	33,5	25,5	18	42	40	5,0	24	18	32,5	93,5	85
5	Çankhai ♂	» » » » »	»	22	29	black tresses	2	152	153	37,4	25,4	57,6	33,2	24	18,4	45	40	6	23,2	13,7	30,8	97	83,4
6	Râmsinh ♂	» » » » »	»	20	43	black tress	3	160	162,3	40	28	60,5	35,7	27,2	17,7	46,6	41,5	5,2	24,2	14,2	33,5	100	86
7	Reyong ♂	» » » » »	Tipperah	30	43	sleek black	2	158	160	38	25,4	59	33,1	26,4	17,5	46,4	41,5	6,3	23,4	15,2	32,4	95,4	83,8
8	Narsinh ♂	» » » » »	»	18	37	sleek black	2	161	160	37	20,5	60,4	34,7	25,4	19,5	49	42,2	6,9	23,2	16	32	87	79
9	Kanto ♂	» » » » »	»	18	29	sleek black	1	166	169	40,5	27	62,2	38,2	29,5	20,2	49,2	45,5	6,4	24,9	9,4	33,5	100	86
10	Loshban ♂	» » » » »	Banjogi	30	—	—	—	161	160	39,4	25,6	59	35	25,6	17,8	44,4	39,4	5,4	23,9	13,1	33	97,8	83
11	Kalaina ♂	» » » » »	»	20	—	—	—	165	168	36,6	26,5	61,5	36,4	27	20	48,5	42,1	5,5	25,1	15,8	34,3	96,5	83,3
12	Ranjit ♂	Ruma on the Sangu	»	19	—	—	—	159,5	164	40,2	26,7	61,5	34,6	26,3	19,5	43,5	41,2	6,2	24,2	15,2	31	100	85
13	Mojong ♂	Rangamati	Magh	18	—	—	—	164,5	166	39,7	24,8	56,5	34,4	26,5	20,3	46,4	44,5	6	23,8	11,1	32	96	85
14	Satafru ♂	»	»	20	30	sleek black	3	169,3	165	40,9	27,3	67,6	34,9	27,9	19,5	52	45,7	5,8	24,5	12	35	99	83,5
15	Konglafra ♂	»	»	25	—	—	—	178	182,2	46,3	28,1	68,3	37,5	28,4	21,2	57	48,1	7	25,7	17	33	105	89
16	Kishto (Chief) ♂	»	Chakmâ	31	30	sleek black	1	158	157	39,3	21,7	64,2	32,3	24,3	18,8	49	41,6	6,1	23,7	19,8	23	94	80
17	Gopînâth ♂	»	»	34	30	sleek black	2	164	167,5	41,8	20,7	59,8	36,1	25,4	18,3	49	44,4	4,5	23,2	15,2	34	98	85
18	Ankan ♂	»	»	39	29	sleek black	2	163,5	167	42,1	25,2	60	35	27	20,4	48,2	45,3	6	23,6	15,8	35	99,7	84,5
19	Kelek ♂	Rangkoung on the Karnaphuli	Toungjinya	60	29	gray sleek	3	165,5	169	40,8	28	63,5	33,4	26,4	19,8	46,5	45,3	6,5	25,7	19,9	34	98	90
20	Rigjong (Chief) ♂	Miniksori on the Sangu	»	50	—	—	—	159	162	41	28,3	63,5	34,5	25,5	18,7	44,8	44	6,8	23,4	21,1	36	110	98
21	Suebo ♂	» » » »	»	52	—	—	—	167	163	41,6	28	60,5	36,9	27,7	21,8	48,8	47	6,8	26	18,1	36	104	89
22	Laong ♂	Ruma on the Sangu	Mro	20	—	—	—	166,6	167,5	40,7	27	63,8	34,6	25,6	19,8	53,4	43,5	5,8	24,9	19,5	32	98	85
23	Manglo ♂	» » » »	»	47	—	—	—	160	161	35,9	27,4	62,7	34,5	26,2	19,6	48	41,5	5,7	24	13,4	32,5	92	81,5
24	Kungnjo (Chief) ♂	» » » »	»	45	—	—	—	157,2	156	36,8	26,3	62	34,2	24,7	18,8	43	41	5,8	24	13,3	33	93	80,5
25	Bradwei ♀	» » » »	»	40	—	—	—	150	148	34,6	27	62,5	32,4	22,8	17,4	40	35	4,8	22,1	17	31	80,8	84
26	Wittak (Chief) ♂	Dalakmey on the Koledein (Arakan)	Kumi	44	—	—	—	162	164	39	27	62,5	34,2	25	20,1	47	40	6	24,1	18,5	37,3	105	92,5
27	Lintway ♂	» » »	»	27	—	—	—	166	164	44	28,2	63	36,8	29,5	22,6	47	43	5,8	26,5	17	34	102	87
28	Asa ♂	» » »	»	23	—	—	—	166	163	42	26,5	64	35	27,7	21,2	51	42	6,3	24,9	15	34	101	83
29	Jiketo ♂	» » »	Shindu	50	—	—	—	165	168,5	39,7	26,6	61	36	26,7	20	50,5	40	5,5	25,2	12,5	35	99	83
30	Isamke ♂	» » »	»	30	—	—	—	169	170	37,6	26,2	65	36,2	27,3	20	52	44	6	24,9	17	34	98	82,5
31	Njitoh ♂	» » »	»	30	—	—	—	170	174	38,5	26	64	37,4	28	19,2	49,5	44	6	25	16	34,3	97	82
32	Koung-Li ♂	» » »	Sho (Chow)	60	—	—	—	165,2	164	38	28	60,2	34,5	26,9	18,8	41,3	36,9	4,8	24,2	11	32,2	96	84
33	Numkan ♂	» » »	»	50	—	—	—	165	167	38,2	26,2	61	34	27,2	20	48	40	5	25,3	12,2	32,6	95,8	83
34	Sar-bîr-allah ♂	Rangamati	Gorkha (Nepâl)	31	33	sleek black	2	165	161,6	39	28	65,9	32,7	25,8	18,3	52	40	4,9	23,7	15,7	35	97	82
35	Shetta-taba ♂	»	» »	32	—	—	—	169	169	40,5	26,2	61,5	35,6	27,5	19,6	50	45,2	6,4	24,2	18,2	35	107	89
36	Sorkotkarki ♂	»	» »	23	—	—	—	164,8	167	39	26,2	60,3	35	26	19	53	46,5	6,1	24,9	13,7	34,2	107	84,7
37	Kongarâm ♂	»	Asamî	25	—	—	—	165	161	40,4	23,4	63	33,6	26,4	18	49	45	6,2	23,5	16,6	35	101	87
38	Aganrâm ♂	»	»	28	—	—	—	166,7	164	44,2	24,3	62,8	35,6	27,2	20,5	51	44,9	6,7	26,5	13,8	36	110,2	93
39	Mahârâm ♂	»	»	29	—	—	—	156	159	37,6	23	62	32	25,9	18,3	50	44,7	6,1	23,6	14,5	33	102	91
40	Isarsinh ♂	»	Manipuri (Kachar)	25	—	—	—	171	168,5	43	24,9	65	36,9	27,5	19,6	54	46,4	5,6	26,5	14	35	105	88
41	Bâlânand ♂	»	» »	25	—	—	—	162,6	167	40	22,4	61	34,2	25,9	19,3	47	44,5	6,1	25	12,5	36	98	83
42	Aukil-Chandra ♂	»	Bengâlî	30	—	—	—	161,5	166	40,6	23,6	55,3	34,9	26,5	18,1	49	40,7	5,7	24	10	32	94	79
43	Krishna Kumâr ♂	»	»	25	—	—	—	168,5	171	39,1	25,8	59,2	36	26,8	20	52	45	6	25,2	13,6	32	91	80
44	Rasik-Chandra ♂	»	»	23	—	—	—	161,5	165	38,8	22,8	58	33,4	26,6	17,2	49	42,3	5,8	23,4	15,1	32	93,5	97

Table II. Proportions calculated in figures.

Compass: round middle of upper arm	Compass: round the wrist	Compass: round the loins	Compass: round the hips	Compass: at the upper thigh	Compass: at the knee	Compass: round the calf	Compass: over the ankles	Greatest length of skull	Greatest breadth of skull	Height of face	Jugal breadth	Upper facial breadth	Lower breadth from one maxillar angle to the other	Nasal hight	Special Remarks	Difference between height from crown to sole and distance of outstretched arms	Full length of arm (upper arm, fore arm and hand)	Full length of leg (thigh, fore leg and foot)	Relation of arm to leg, latter = 100.	Relation of upper arm = 100 to fore arm.	Relation of thigh = 100 to fore leg	Relation of upper arm to thigh, latter = 100	Relation of fore arm to thigh, latter = 100	Relation of foot II to full height from crown to sole, latter height = 100	Relation of facial height (from nasal root to lower edge of chin) to jugal breadth (from one zygomatic arch part of one zygomatic arch before the ear to the opposite), latter = 100	Relation of facial height (from nasal root to lower edge of chin) to upper facial breadth (from lower anterior border of one ear to the same side of the other), latter = 100	Relation of facial height (from nasal root to lower edge of chin) to lower breadth of the jaw (angle to the other, latter = 100	Relation of greatest cranial length (from glabella (just above nasal root) to most projecting point of occiput) to greatest cranial breadth (above the ears)	No.
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
24,4	15,4	80	88	52	36,5	34	22,5	20	15,5	13,6	15,1	14,2	12,9	5,8	Pl. 17. Fig. 2.	+ 2	88	108,5	81,2	70,3	84,2	67,3	56,1	15,9	6,5	90,1	95,8	105,4	77,5	1
23,4	16,2	71,7	87	45	33,5	33,2	20	18,4	15	11,8	14,5	14,3	11,7	5,1	Pl. 17, Fig 1 a. b.	— 5	82	100,9	81,3	77,5	93,6	73,8	60,6	14,9	6,7	81,4	82,5	100,8	81,5	2
25	16,1	77	85,5	46,6	35,4	33,5	20,2	19,8	16,2	12,4	15,7	14	11,4	5,4	Pl. 18, Fig. 1 a. b. with marks of branding on breast.	— 3	76,3	96	79,5	86,1	95,6	66,4	59,8	16	6,7	79	88,5	108,8	81,8	3
24	15	80	83,5	45	33,5	33,5	20,6	20	14,3	12,6	14	13,6	10,6	4,8	Pl. 18, Fig. 2.	— 1	77	87,2	88,3	76,1	95,2	79,8	63,7	15,4	6,3	90	92,7	118,9	71,3	4
22,5	15	68,5	79,7	42,5	32,3	32,2	19,6	17,6	13,6	13,1	13	12,9	12	5	Pl. 18, Fig. 4 a. b.	— 1	75,6	91	83,1	72,3	88,9	73,8	60	15,4	6,3	100,7	107,4	109,2	77,2	5
23,7	16,5	70,4	80	43,2	34,3	33,5	20,7	18	15,1	12,6	14,2	13,5	12,5	5	Pl. 18, Fig. 3 a. b.	— 2,3	80,6	93,3	86,4	76,2	89,1	76,6	65,3	15,1	6,6	88,7	93,3	100,8	83,9	6
27	16	74	84	44,8	34,3	35	21,7	18,5	15	12,5	14,3	12,6	11,5	5,1	Pl. 20, Fig. 1 a. b.	— 2	77	94	81,9	79,8	89,4	71,3	63,6	14,8	6,7	87,4	99,2	108,7	81,1	7
22	16,2	59	81,2	45,6	32,5	30,8	20,7	17	14,2	12	13	12,2	9,9	4,9	Pl. 20, Fig. 2 a. b.	+ 1	79	98,1	80,5	74,5	86,1	69,6	60,2	14,4	6,9	92,3	98,4	121,2	83,5	8
26	16,5	71,5	85,4	48,7	34,6	33,5	21	17,7	14,7	12	14,1	13	11,3	4,8	Pl. 20, Fig. 3 a. b.	— 3	87,9	101,1	86,9	77,2	92,5	77,6	64,8	15	6,7	85,1	92,3	104,3	83	9
25	16	70	81	47	33,5	31,6	19,5	18	14,5	12,3	14,5	13	11	5,3		+ 1	78,4	89,2	87,8	73,1	88,7	78,8	65	14,8	6,7	84,8	94,6	111,8	80,5	10
26	16	70	86	49	34,8	33,5	21	18,5	14	12,3	13,5	12	10,3	5,6		— 3	83,1	95,9	86,7	74,8	87,2	74,7	64,1	15,2	6,6	91,1	102,5	119,4	75,7	11
24	16,3	69	82	44	34	32,5	21	18,8	14,8	11,9	14	11,5	10,9	5,6		— 4,5	80,6	90,9	88,7	76,6	94,7	79,3	64,3	15,2	6,4	85	103,5	109,2	78,7	12
23	15	63	85	49	34	33	20,5	18	14,2	12,3	14,8	12,8	10,6	5		— 1,3	81,2	96,9	94,2	83,8	95,9	74,1	59,5	14,5	6,7	83,1	96,1	116	78,9	13
25	17	70	90	47	35,3	34	21	17,9	15,2	12,5	14,3	13,9	11,8	5	Pl. 19. Fig. 1.	+ 4	82,3	103,3	79,5	79,9	87,9	67,1	61,1	14,4	6,7	87,4	89,9	105,9	84,9	14
26,2	17	75	95	57	38	36	23	18,6	15,1	12	13,8	13,5	10,9	5		— 4,2	87,1	112,1	77,7	75,7	84,1	65,8	59	14,4	6,9	86,9	88,9	110,1	81,2	15
22	16	61	81	43	33	32	20	17,2	14,6	10,5	13,6	11,6	10,5	4,9	Pl. 19, Fig. 3 a. b.	+ 1	75,8	96,7	78,4	75,4	84,9	66,3	58,8	15	6,6	77,2	90,5	100	84,4	16
25	15	63	84	46	32	33	19	18,6	14,7	11,9	14,1	13,2	11	5,6	Pl. 19, Fig. 4.	— 3,5	80	98,2	81,4	70,4	90,6	73,7	57,2	14,4	6,9	84,4	90,1	108,2	79	17
25,7	16	66	83	47	33	34,5	20	18	16,2	13,5	14,6	13,2	12,4	5,8		— 3,5	82,4	99,3	82,8	77,2	94	72,6	59,6	14,4	6,9	92,4	102,3	108,9	90	18
26	16	74	88	51	35	34,3	20	18,4	16	13	14,2	12,9	11,5	5,6	Pl. 19, Fig. 2 a. b.	— 3,3	79,6	98,3	81	79	97,4	71,8	58,5	15,3	6,9	91,5	100,8	113	86,9	19
29	17,5	86,5	96,5	56	38	37	21,5	18,6	16,2	13,2	15,7	13,2	11,6	5,5		— 3	78,7	95,6	82,4	73,9	98,2	77	57,9	14,7	6,8	86,7	99,2	112,9	86,6	20
26	18	74	90	48	36	35	20	18,8	16,4	12,3	15,4	14,5	11,5	5,7		+ 4	86,4	102,6	84,2	75,2	96,3	76	58,9	15,6	6,4	79,9	84,8	106,9	87,2	21
24,5	17	71	85	50,3	36,5	34	21	17,4	15,7	11,8	14,5	12,4	10,8	4,5		— 0,9	80	102,3	78	74	81,2	64,8	58,4	14,9	6,7	81,4	95,2	109,2	90,2	22
21,5	15	69	79	45	31,5	30	18,5	18,2	13,7	12,5	14	12,5	10,7	4,9		— 1	80,3	95,2	84,3	75,9	86,5	71,9	63,1	15	6,7	89,3	100	116,8	74,9	23
23	15,3	67	78,5	41	33	30	18,5	18	14,2	12,6	14	12,3	11	5,7		+ 1,3	77,6	89,8	86,4	72,4	95,3	79,3	60,2	15,9	6,5	90	102,4	114,5	78,9	24
23	14,3	87	90	46	36	45	19	17,2	14	11,7	12,6	11,4	9,9	4,5		+ 2	72,6	79,8	91	70,4	87,5	81	65,1	14,7	6,8	92,9	102,6	118,2	81,9	25
28	17,5	85	91,3	54,3	37	39	23	19,5	16	12,9	15,2	12,7	11	5,6		— 2	79,3	93	85,3	73,1	85,2	72,8	62,5	14,9	6,7	84,9	101,6	117,3	82	26
26	17	75	87	50	33,5	37	23	19,5	14,2	12,6	14	12,5	11,6	5,2	Chief's son.	+ 2	88,7	95,8	91,5	80,6	91,5	77,9	68,8	16	6,3	90	100,3	108,6	72,8	27
24,5	17	62,5	85	46	33	33	21,5	18,9	13,5	12,1	14,2	12,6	11,6	4,9		+ 3	83,9	99,5	84,3	79,1	82,3	68,6	65,9	15	6,7	85,2	96	104,3	71,4	28
25,3	18	75	84,6	46	33	34	22	19,6	14,8	13	14,1	12,4	11,5	5,5		— 3,5	82,7	96	86,1	74,2	79,2	71,5	66,7	15,3	6,3	92,2	104,8	113	75,3	29
26	17	70	85	48	33,5	36	24	18,7	15	11,9	14,3	12,6	11,8	4,9		— 1	83,5	102	81,9	75,4	84,6	69,6	62	14,7	6,8	83,2	94,4	100,8	80,2	30
23,6	16,5	74	88	47	34	36	23	18,5	14,7	12,1	13,5	13	11	5,5		— 4	84,6	99,5	85	74,9	88,2	75,5	63,7	14,7	6,8	89,6	93,1	110	79,4	31
23	16	76	83	46,5	33	33	20	18,2	15,3	12,5	14	12,1	10,6	5,2		+ 1,2	80,2	83	96,6	78	89,3	83,5	72,9	14,6	6,8	89,3	103,5	117,9	84,1	32
23,8	15,9	71	87	48,5	33,5	32,5	22	18,5	14,4	14,1	14,3	12,4	10,5	5,6		— 2	81,5	93	87,6	78,8	83,5	71,7	67,7	15,3	6,5	98,6	113,7	134,3	77,8	33
24	17	71	86	46	33	32,7	21	18	15,7	12,5	14	13	11,2	5,4	Pl. 4, Fig. 4.	+ 3,4	77	96,9	79,5	78,9	76,9	62,9	64,5	14,4	7	89,3	96,1	111,6	87,2	34
24	16	77	88	47	34	36	22	18,6	14,5	12	13,8	12,6	10,5	5		+ 0	82,7	101,6	81,4	77,3	90,4	71,2	60,8	14,3	7	86,9	95,2	114,3	77,9	35
25	17	72,7	85	49,3	36	34	21	17,4	13,9	11,6	12,7	10,9	9,8	5,7	Frontier troops in Rangamati on the Karnaphuli river.	— 2,2	80	105,6	75,8	74,3	87,7	66	55,9	15,1	6,6	91,3	106,4	118,4	79,9	36
27	17	67	87	50	35	34	23	18,5	14,2	12,5	13,4	12,6	11,5	4,8		+ 4	78	100,2	77,8	78,6	91,8	68,6	58,7	14,2	7	93,3	99,2	108,7	76,8	37
29	18	76	91	54	36	35	23	18,3	14,5	12,8	13,4	12,5	11	5,2		+ 2,7	83,2	102,6	81,1	76,1	88	69,8	60,3	15,9	6,3	91	97,6	110,9	79,2	38
26	16	72	91	47	35	32	20,5	17,3	14,5	10,4	13,7	11,7	11,6	4,7		— 3	76,2	100,8	75,6	80,9	89	64	57,9	15,1	6,6	75,9	88,9	89,6	83,8	39
25	19	73	87	54	36	34	22	15,4	13,7	13,7	14,4	13,6	11,2	6,2		+ 2,5	84	106	79,2	74,5	85,9	68,3	59,3	15,4	6,4	95,2	100,7	122,3	88,9	40
25,2	17	67	86	48	35	34	22	18,2	14,5	12,6	13,2	12,2	10,9	5,4		— 4,4	79,4	97,6	81,4	75,7	94,7	72,8	58,2	15,4	6,3	96,2	104,2	115,6	80,2	41
21	16	61	74	44	31	30,5	20	18,2	15,2	12,5	13,5	11,2	10	5,4		— 4,5	79,5	95,4	83,3	75,9	83,2	71,2	65,2	14,8	6,7	93,3	113,5	126	84	42
22	15	62	80	45	30,5	29,5	18	17,8	14,7	12,2	13,3	11,8	9,4	5,4	Officials.	— 2,5	82,8	103	80,4	74,4	86,6	69,2	59,5	15	6,9	91,7	103,4	129,8	82,6	43
21,4	14	59	74	42	30	28	18	18,4	14,5	12,4	13,2	11,8	10,6	5,3		— 3,5	77,2	97,2	79,5	79,6	86,4	68,2	62,9	14,5	6,9	94,6	105,2	117	78,8	44

PLATES 17—20.

PLATE 17.

Figs. 1 a, b. Lushai.

Fig. 2. Lushai.

Figs. 3 a, b. Lushai.

Fig. 4. Lushai.

Fig. 5. Lushai.

PLATE 18.

Figs. 1 a, b. Lushai.

Fig. 2. Pankho.

Figs. 3 a, b. Pankho.

Figs. 4 a, b. Pankho.

PLATE 19.

Fig. 1. Magh.

Figs. 2 a, b. Toungjinya (Chakmâ).

Figs. 3 a, b. Chakmâ (Chief of Bengali stock).

Fig. 4. Chakmâ (Arakanese type).

PLATE 20.

Figs. 1 a, b. Tipperah.

Figs. 2 a, b. Tipperah.

Figs. 3 a, b. Tipperah.

LUSHAI.

1a.

1b.

2.

3a.

3b.

4.

5.

Phot. Alb. Frisch, Berlin.

LUSHAI.

PANKHO.

1a.

1b.

2.

PANKHO.

3a.

3b.

4a.

4b.

Phot. Alb. Frisch, Berlin.

MAGH.

TOUNGJINYA.

1.

2a.

2 b.

CHAKMA.

3 a.

3 b.

4.

Phot. Alb. Frisch. Berlin.

TIPPERAH.

1a.

1b.

2a.

3a.

3b.

2b.

Phot. Alb. Frisch, Berlin

IV. ZOOLOGICAL.

Here Plate 21.

REMARKS ON THE GAYAL SKULL BROUGHT BY DR. EMIL RIEBECK FROM CHITTAGONG

by

PRIVY COUNSELOR PROF. DR. JULIUS KÜHN,

Director of the Agricultural Institute at the University of Halle.

To the skull from Chittagong is attached a label describing it as a "buffalo skull". But from the massive concave frontal bone, with the highly developed occipital protuberance, it is evident at the first glance that there is here no question of a real buffalo's skull. This is confirmed by the ticket of a second skull from the province of Arakan adjoining Chittagong, and which is called a "Gayal — Wild Buffalo". The true wild buffalo of India is the Arni, the prototype of the tame buffalo, Bubalus indicus, which is entirely excluded from consideration by the whole form of the skull and horns of the present specimen. Hence the expression "buffalo" in this label is not to be taken in a zoological, but only in that general sense, under which are comprised strong, untamed cattle of the most diverse species. By the addition of the word "Gayal" the species of the second skull is more closely defined, and as this substantially agrees with that from Chittagong, there can be no doubt that the latter also belongs to a gayal. The gayal or Gyall, Bos Gavaeus Colebrooke (B. frontalis Lamb; B. sylhetanus Cuv.) is the wild ox of Further India, whose range however extends to Bengal and Assam. As a distinct species it differs from the Gaur, Bos Gaurus Evans (B. cavifrons Hodgson), which is spread throughout India proper, and also appears to occur further east beyond Bengal. According to these statements both species seem to exist side by side in this province. On their characteristic features little agreement prevails amongst observers. In his classical work "Essay on the natural history of the Ox", Rütimeyer has critically examined the older accounts, completing them by his own more searching studies of gaur skulls. But lacking the material for the comparative study of gayal skulls, he failed to arrive at conclusive results. To have procured us such material during his explorations is the special merit of Dr. Riebeck. His collection of skulls of Indian wild cattle presented to the Agricultural Institute of this University becomes all the more important that, through a happy coincidence, an opportunity is afforded for turning them to account here in Halle, such as occurs nowhere else at least in Germany. For in the year 1880 the honourable Committee of the Calcutta Zoological Garden has presented our Agricultural Institute with a pair of living Gayals, which come from the same locality as the above figured skull. Dr. Anderson, Professor of Comparative Anatomy in Calcutta, and member of said Committee, has informed me that these animals were procured for our collection directly from Chittagong and kept only a few months at the Calcutta Gardens, pending the most opportune time for forwarding them. Their genuine character is thus guarranteed both by the place of their origin, and by one of the best authorities on the Indian fauna. The male gayal so kindly presented to us is still alive and the progenitor of a numerous half breed. But after giving birth to a full-blood calf the cow died in 1882, victim of an attempt at inoculation against pulmonary affections. However painful the loss, the osteological comparative materials thereby secured redound to the advantage of the present enquiry.

Rütimeyer (loc. cit.) describes as the "only well-informed source" for the diagnosis of the Indian wild cattle Hodgson's communications to the Journal of the Asiatic Society of Begal, VI[2] and following volumes. This author indicates the following points in which the skull of the gayal (Bos Gavaeus or sylhetanus) contrasts with that of the Gaur (Bos cavifrons):

> Bone substance light with smooth surface. Breadth of forehead rapidly diminishing forwards, although in profile less concave. No frontal ridge; orbits not prominent; nasal bone straight and short, not reaching to the intermaxilla. Attachment of horns on the top of the frontal plane, only here also a rising of the frontal margin between the horns, falling thence vertically to the occipital plane. The latter smaller than in the Gaur, but larger than in all other cattle, with rather less deep and higher temporal groove than in Bos cavifrons. Upper half of the occipital plane forms an oblique square smaller than the lower, which is obliquely oval. Horns of shorter conical shape than in Bos cavifrons, with oval but less flat section at the base; directed forward and somewhat backward and upward, diverging more and more towards the tips.

With this description of the gayal skull that of the cow which died here agrees in every respect, as do also all the corresponding features that could be observed on the living gayal bull. The formation of the horns especially is also exactly like that described by Hodgson. These wedge-shaped horns, short, but very strong at their oval root, do not project above the frontal ridge, but lie on a level with it, and turn somewhat backwards, the extreme tips alone being very slightly upturned. Nor is an occipital protuberance present on the bull; but on the other hand a frontal ridge has been gradually developed in one of his mongrel heifers, which was calved by a Sanga cow at the end of December 1882 and is consequently now 16½ months old. So great is the agreement of our original bull and the skull of the original cow with Hodgson's description of the gayal, that it might be supposed to have been made from these specimens. On the other hand all the gayal skulls procured by Dr. Riebeck in Chittagong and border lands present the most striking contrast to Hodgson's description of the gayal, harmonising far more closely with his account of the gaur in their highly developed occipital protuberance, in their more decidedly concave brow, and in the form and direction of their horns. The latter, very flat at the root, become round towards the tips. They spring deep under the level of the frontal ridge, branch off laterally and a little downwards, then turning up and backwards in a finely developed curve, the tips being thus ultimately directed inwards so as to approach each other. This growth of horn occurs both in the male and female skull, only those of the former are much stronger. The skull from Chittagong figured on Plate 19, Figs. 1 and 2, belongs to a cow, and not only agrees in like manner with Hodgson's description of the gaur, but also with the representations of a female gaur given by Rütimeyer, loc. cit. pp. 99, 100. Only the intermaxillary bones so far deviate that in the Chittagong skull they touch the nasal bone, as clearly shown in the side view, Fig. 2, which is not the case in the skull figured by Rütimeyer. This relation however is not constant. In a male skull of the Riebeck collection the intermaxillary also reaches the nasal bone, which does not occur in any of the other skulls. In an extreme case the end of the intermaxillary remains 29 mm distant from the nasal. A further deviation lies in the unusual shortness of the nasal itself, although here the relation is not constant. In other skulls of the Riebeck collection the length of the nasal even exceeds the mean as determined by Rütimeyer's representation. Finally in the latter the occipital ridge is somewhat deflected in the middle, whereas in the Chittagong skull it describes a uniform curve. But this discrepancy also occurs within the range of individual varieties. Rütimeyer expressly observes that in the middle of the frontal ridge gaur skulls are "sometimes somewhat deflected", and "sometimes not". The frontal ridge itself, which for the gaur is the most characteristic feature next to the form of the horns, is even still more developed in the female Chittagong skull, than in the female gaur skull figured by Rütimeyer, taking it in its entire circuit from the orbits to the border of the occiput, and especially in the latter. Hence in the Chittagong specimen the gaur type in most perfectly marked, and this is to a like extent the case in all the other skulls of the Riebeck collection belonging to the wild gayal. Fuller proofs of this I shall offer in a treatise, which will shortly appear in the Proceedings of the Geographical Society of Halle, and which will also give the measurements of the above figured Chittagong skull. While the wild gayal's skulls thus show all the features of the gaur, the forms of the tame gayal from the same locality on the contrary correspond, according to the original specimens in our garden for domestic animals, altogether to the normal gayal type as described by its best observer, Hodgson. Room is thus afforded for the surmise that both types characterise, not two distinct species, but forms only of the same species, that consequently gaur and gayal are specifically one, and that the deviations of the latter in its tame form have merely the value of a variation due to domestic-

ation, hence are solely to be regarded as characteristics of breed. This view is confirmed by the modifications arising within both types. From the representations given by early observers it follows that the horn of the tame gayal does not always diverge laterally at the level of the frontal ridge so uniformly as with our bull, but occasionally rises above it, while the tip has a more upward bend.[1])

On the other hand the length of the horns and the measure of their height are not always equally great even in the wild animals, while discrepancies are also shown in the concavity of the forehead and size of the occipital protuberance. From this the origin of one form from the other becomes intelligible. No doubt another distinctive feature has been adduced, said to be based on a difference in the number of dorsal vertebræ and ribs. Thus the gayal, as pointed out by George Vasey (Ox Tribe p. 152) would have 14 dorsal vertebræ and pairs of ribs, but the gaur 13 only. But the Original gayal cow which died in our garden for domestic animals had only 13 pairs of ribs, and the full-blood calf born of her the same number. At the same time the occurrence of 14 pairs of ribs cannot be questioned; but this is merely an individual variation, which occurs also in other bovine species. The American bison, for instance, has normally 14 pairs of ribs, while a specimen in the collection of skeletous in our Agricultural Institute shows 15 pairs. Hence no specific difference between gaur and gayal can be based on the number of dorsal vertebræ and ribs, as they in fact agree in these respects. But according to the above details the strongest proof of the fundamental unity of both forms lies in the structure of the skulls of the wild cattle which we owe to Dr. Riebeck. By their means he has earned the great merit of having brought nearer to a possible solution a scientific problem, which has its importance even for stock-breeders.

Halle, May 15. 1884.

In explanation of the three skulls of mammals figured on Plate 21, Figs. 3—5, the following remarks are submitted. These are provided with a plaited handle, with which to suspend them either as ornaments or house guardians. They belong to three different species, the largest to a rhinoceros, the smallest to an ape, and the third to a bear.

The rhinoceros skull at once suggests the awkward unwieldy forms so characteristic of this animal, and could scarcely fail to be recognised at the first glance even by the ordinary observer. The two highest points of the cranial roof are formed by the occipital and nasal bones, while the intervening depression is occupied by the parietal and frontal bones. The nasal bone, confining ourselves to the one-horned Indian species (Rhinoceros indicus s. unicornis), is usually even more highly arched than is the case in the specimen here figured, in which the down-turned extremity has also been somewhat damaged. The great development of the nasal bone, which has grown to an osseous process, is very characteristic of the configuration of the rhinoceros skull, and is explained by the horn of this animal, which is supported by that process. In the case of the two-horned variety the posterior horn springs from the frontal bone. This nasal appendage, however, has nothing to do with the framework of the head, but is exclusively formed by the epidermis, and may be regarded as a highly developed pilose growth. Hence this horn is quite a different formation from the antlers of a stag, or the frontal processes bearing the horns of the ox, which are also attached to the epidermoidal skeleton. Nevertheless the place where the rhinoceros horn springs is marked on the bone, which here presents a rough or rugged appearance, while round about showing the smooth surface common to bones.

Another peculiarity, which at once strikes us in Fig. 5, is the vast interval between the nasal bone and the anterior section of the upper jaw, relatively to the intermaxillary. In the present instance this gap seems for several reasons even greater than it really is. First of all the tip of the down-turned nasal bone, as already stated, is not preserved intact, and in the second place the partly osseous partly gristly parts are missing, by which the pituitary membrane is supported. Had these been preserved, the empty space in question would have been longitudinally divided by the

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[1]) This is also confirmed by a tame gayal bull recently acquired for our Agricultural Institute from the Calcutta Zoological Garden. The horns growing continually rounder from a broad oval base, are at first directed slightly down and backwards, and then in a broad open curvature upwards, so that the tips rise 18 cm above the frontal ridge measuring from the base of the horn. The tips are no doubt at a span of 76 cm still apart, consequently still turned somewhat outwards; but a slight increase of the bend would deffect them inwards. Hence this form of horn of our newly acquired gayal constitutes an unmistakable transition to that of the wild gayal, which is more curved and has the tips inclined towards each other, as represented in Pl. 19, Fig. 1. Halle, October 15, 1884. D. V.

vertical nasal septum. In all living species of the rhinoceros, as in fact in all mammals this is gristly, although in two-extinct species it was partly (Rh. leptorhinus) or fully (Rh. tichorhinus) osseous, forming a kind of support for the prominent vaulted nasal bone.

Lastly in the present specimen the anterior end of the upper mandible, or, to speak more accurately, of the intermaxillary, no longer survives in its normal form, but has been slightly sawn off, possibly for the purpose of some inquiry. In the rhinoceros this intermaxillary from the zoological standpoint happens to be of special interest, as the bearer of the upper incisors. In two-horned African species these are developed in the milk-teeth only as small, blunt stumps. Then they disappear altogether, and in adults the very trace of their former presence can all the less be detected that the alveoles themselves close up. But in the present species and its Asiatic congeners permanent incisors are found, the milk-teeth here finding their usual substitutes. There are four above and below, of which however two only in each row show a normal development, the two anterior above and the two central below remaining small and stumpy, and with old age falling out altogether. The two others are of considerable size, sharp and chisel-shaped; in our drawing one socket in the lower jaw is clearly shown. In the specimen the teeth themselves are no longer present, having been extracted by the natives and used especially as ornaments. The dental system of the rhinoceros family is otherwise distinguished by the absence of the eye-teeth, giving rise to a considerable gap between the incisors and molars. In each half maxilla both above and below there are seven molars, of which four already in the milk dentition. On their highly characteristic forms, differing in the upper and lower series, as well as on the appearance of the masticatory surfaces, so important in systematic zoology, we need not here dwell further, as no clear idea on these points can be had from the present illustration.

It may be mentioned in conclusion that in the rhinoceros the lachrymal bone receives a considerable expansion. This is the bone enclosed by distinct sutures, which lies on the anterior edge of the orbit in the direction of the lengthened nasal cavity. The edge facing the orbit is provided with a tuberous process; and as no processes extend either from the frontal or cheek-bone, the orbits form a common fossa with the temporal cavities.

On the two other skulls figured on our plate still less need be said. That of the bear (Fig. 4) is characterised as belonging to a carnivora by the ridge-like prominences on the sutures between both parietals, and between these and the frontal bones, as is clearly shown in the illustration. Only it may be incidentally remarked that in this respect the bear tribe takes a lower position than most other beasts of prey, amongst which the felidæ, possessing the fiercest disposition, also show the largest ridges and crests on the skull. These processes serve in fact as attachments for muscles; hence afford a standard for the strength and ferocity of animals. The same applies to the powerful and highly prominent cheek-bones, within which are contained the strong biting muscles. That the habits and disposition of animals are shown above all in their dental system is well known. This feature is accordingly highly characteristic for the carnivora, all of whom are furnished with six upper and lower incisors, besides canines in both jaws. The latter in the present specimen display quite an exceptional development. Of molars there are six on both sides above, seven below, the former small, cone-shaped and deciduous in old age. A special canine, so characteristic of the feline group, is not developed, while the back molars are blunt and jagged, the last and last but one attaining a great size above. Their grinding surface adapted for mastication is a special indication of the omnivorous character of the bear.

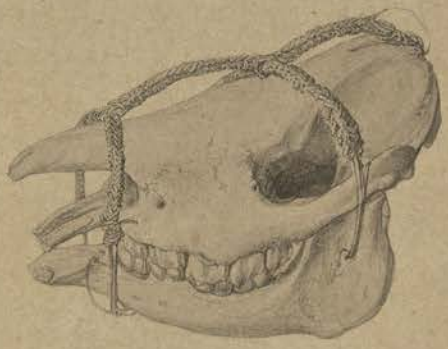
Lastly the ape skull (Fig. 3), which would seem to belong to a macacus, is characterised by the somewhat highly ridged and completely closed orbits, as well as by the sharp angles at which the occiput stands off from the rest of the skull. As in all apes of the old world the nasal diaphragm is narrow, the nasal fossa directed outwards, and the number of teeth the same as in man. The incisors and canines together with the lower jaw are unfortunately missing in the specimen here illustrated.

2.

1.

4.

5.



3.

Phot. Alb. Frisch Berlin.

V. METEOROLOGICAL.

REMARKS ON DR. RIEBECK'S METEOROLOGICAL OBSERVATIONS.

During his trip to the Chittagong Hill Tracts, up the Irrawady and in British Barma Dr. Riebeck took as comprehensive meteorological records as was possible under the circumstances. These we here reproduce in extenso, as the best means of turning them to account. Unfortunately the "Report on the Meteorology of India", as regularly issued by the Indian Government, is not yet published for the period to which these observations refer. Hence no comparison can here be made between the results of our traveller's records and those of the official meteorological stations, which, like Akyab, Bassein, Rangoon, Moulmein, Tounghoo &c, lie mostly on the coast.

The observations were carried out with instruments, which were tested at the Leipzig Observatory before the expedition set out, and Dr. Riebeck was also at much pains to check them on all possible occasions during the journey. The barometric observations were executed with an accurately compensated Aneroid by Schadewell of Dresden. This Aneroid was afterwards tested at the Calcutta Observatory before starting on the excursion to the Chittagong district, and again at the Batavia Observatory. These barometric observations are thus comparatively quite trustworthy, the corrections made from time to time being always known. After Dr. Riebeck's return to Europe the instrument was again thoroughly tested at the German Marine Observatory of Hamburgh and found to be in excellent condition. At present it accompanies Dr. Krause on his Niger expedition.

A portion of Dr. Riebeck's trip coincides exactly with the shifting of the North-east to the South-west Monsoon, which in this region occured in 1882 at the end of March. The anemometric records made during the excursion on the Irrawady were naturally affected by the hills skirting the river. As the points of observation frequently change, we have made no attempt to deduce averages from these records. The data on the rainfall at Ruma, which Dr. Riebeck managed to obtain in manuscript, deserve all the more to be here printed, that this station is not included in the already mentioned Official Report for 1881.

From these data it appears that in the year 1881 the rainy season began at Ruma earlier than on the coast, in fact in April, a month which was still dry at Sandoway, Rangoon, Bassein &c, and that it also ceased there sooner than at those stations, that is, in October instead of November.

Chittagong Hill Tracts { 21° 13′ — 23° 47′ N. Lat. / 91° 46′ – 92° 49′ E. L. Gr.

1882	Pressure 700 mm + 7a.	2p.	9p.	Temperature 7a.	2p.	9p.	Max.	Min.	Cloudiness 7a.	2p.	9p.	Direction and Force of the Wind 7a.	2p.	9p.	Remarks.
				°	°	°	°	°							
Febr. 26	—	60,4	57,6	—	25,6	16,9	—	—	—	0	0	—	NE 2	0	In Rangamati the records were taken on an open breezy hill some 60 meters above the river.
27	59,8	57,5	58,6	—	26,9	17,7	—	—	0	0	0	0	NE 2	0	
March 2	59,0	53,0	55,5	12,8	28,1	18,7	29,0	12,0	0	5	0	NE 1	NE 2	E 1	
3	56,5	55,1	55,0	14,8	28,8	20,7	30,0	13,0	0	0	5	NE 3	NE 4	NE 1	
4	57,3	56,0	58,3	14,9	31,2	20,2	31,5	12,0	7	3	5	NE 3	NE 6	NE 2	
5	61,1	59,0	59,0	14,9	30,0	18,7	31,0	11,0	5	0	10	NE 2	NE 5	NE 2	
6	60,0	57,0	58,0	14,9	29,7	18,7	31,5	12,0	10	0	0	NE 1	NE 1	NE 1	7h 30′ p. m. slight earthquake lasting 10 minutes from W to E.
7	56,0	57,0	—	15,7	30,7	—	—	—	0	0	—	NE 1	NE 4	—	
8	55,0	—	—	17,7	—	—	32,0	17,5	10	—	—	NE 1	—	—	
March 9	—	59,4	59,8	—	32,8	22,2	—	—	—	Cir. 3	0	—	—	—	Observations on the upland journey from Rangamati to Demargiri in a small boat with a mat awning. The River (Karnaphuly) is hemmed in by lofty Mountains.
10	61,2	58,3	60,0	21,0	31,4	22,3	—	—	Cum. 5	0	0	—	—	—	
11	60,2	59,0	57,4	22,2	29,7	22,9	—	—	Cum. 8	0	0	—	—	—	
March 12	57,7	—	57,2	19,5	—	22,5	32,9	20,0	0	0	0	NE 3	—	NE 5	Records at Demargiri.
13	57,0	54,9	57,0	16,2	30,7	19,3	31,5	16,0	Cir. 1	0	0	N 5	N 2	N 5	
14	57,5	—	56,5	16,2	—	20,2	31,8	15,3	0	—	0	N 3	—	0	
15	57,2	—	56,5	18,2	—	21,2	31,8	15,0	0	—	0	N 3	—	0	
16	57,5	—	—	18,2	—	—	—	16,3	0	—	—	N 4	—	—	
March 16	—	58,9	—	—	32,2	—	—	—	—	0	—	—	—	—	Observations in the boat on the trip to Rangamati.
17	61,5	58,2	56,5	16,9	31,9	16,9	—	-	10	Cir— c. 3	0	—	—	—	

Observations during the trip on the Irrawady from Prome to Bhamo (Barma) and back.

	1882	Pressure 700 mm + 7a.	2p.	9p.	Temperature 7a.	2p.	9p.	Max.	Min.	Cloudiness 7a.	2p.	9p.	Direction and Velocity of the Wind 7a.	2p.	9p.	Remarks.
					°	°	°	°	°							
Military Station of Burkhall.	March 18	57,6	54,9	55,0	15,3	31,0	21,2	31,2	15,2	Str. 1	Str., Cum. 2	0	0	0	0	Observations in the Government Bungalow.
	19	56,0	54,0	—	18,9	31,0	—	31,0	17,7	Str. 2	Cum. 2	—	0	N 1	—	≤ 8 p. m. in NNE, 7—8 p. m. from SW.
Lowland trip Demargiri to Rangamati.	March 20	—	57,6	59,1	23,0	32,1	25,7	—	—	—	Cum. 2	0	—	—	—	
	21	59,5	56,3	58,0	23,2	32,7	26,2	—	—	10	Str. 1	0	—	—	—	
	22	58,5	—	—	25,3	—	—	—	—	Cum. 7	—	—	—	—	—	
Rangamati.	March 23	55,1	52,2	—	25,8	31,7	—	32,2	—	Cum. 8	Cum. 7	—	SE 2	SE 4	—	
	24	54,0	50,1	51,8	23,5	32,3	26,1	32,5	21,0	Cum. 9	Cum. 7	0	SE 2	SE 6	SE 3	
	25	53,0	50,0	53,6	23,9	31,4	26,9	31,5	—	Cir—s. 4	Cum. 6	Cir. 3	SE 2	SE 7	SE 6	from SW to NE 1h 15 p. m., at night and .
	26	56,2	53,2	55,0	20,0	31,3	26,2	—	—	Cum—s. 4	Cum—s. 7	—	0	SW 5	SSW 4	1h 45 p. m. till 3h p. m. ≤ the whole night.
	27	56,4	56,0	57,4	22,5	21,9	20,9	—	—	Cum. 10	Cum. 10	Cum. 3	0	SW 3	0	Slight rain 2 p. m. and ; ≤ the whole night; 11 p. m. and . ≤ the whole night.
	28	56,7	53,0	—	21,2	30,0	—	—	—	Cum. 7	Cum. 5	—	0	SW 5	—	
Bandabau (Sangun River).	April 9	58,0	55,0	59,6	24,2	32,1	23,2	—	—	0	Cum. 4	10	0	SSW 3	SSW 5	4 p. m. with ; in N—E with . and Evening.
	10	59,5	57,0	57,5	23,2	31,4	24,2	—	—	Cum. 8	Cum. 5	Cum. 2	0	SSE 3	SE 1	≤ 9 p. m.
Ruma (Sangun River) in the Government Bungalow.	April 12	48,5	46,7	47,3	22,7	32,9	24,0	—	—	Str. 1	Cum. 4	0	SSE 1	NNE 3	0	1 p. m.; all night ≤.
	13	48,8	46,0	46,9	22,6	33,5	22,8	—	—	10	Cum. 2	0	0	WNW 4	0	
	14	47,7	45,2	—	21,2	35,6	—	—	—	Str. 3	Cir. 2	—	WNW 1	WNW 4	—	
	17	48,4	46,0	48,0	17,9	32,3	19,2	—	—	10	Cum. 3	Cir. 2	0	WNW 2	0	3 p. m. and 5 p. m. in N.
	18	49,3	46,6	49,0	19,2	30,4	22,7	—	—	10	Cum. 5	2	0	SW 2	0	≤ 7—10 p. m.
	19	49,3	—	—	21,9	—	—	—	—	10	—	—	0	—	—	

1882	Pressure 700 mm + 7a.	2p.	9p.	Temperature 7a.	2p.	9p.	River temperature 7a.	2p.	9p.	Cloudiness 7a.	2p.	9p.	Direction and Force of the Wind 7a.	2p.	9p.	Remarks.
				°	°	°	°	°	°							
At Thayetmyo on Brit. Frontier.	May 20	—	50,5	52,0	—	34,0	28,3	—	30,8	29,8	—	Cum. 4	10	—	SE 2	0	⟋, ·² 5-6 p. m.
On the 21. at Minhlaw.	21	51,4	47,6	49,5	26,4	32,6	28,2	29,8	30,2	29,9	Cum—s. 7	Cum. 7	10	NNE 2	NNE 3	0	·² 2—3 p. m.; ⟋ in E 6 p. m. Rain at night.
Noon at Sinbewyoon.	22	49,4	47,5	49,4	27,0	28,4	26,3	29,8	30,1	29,5	Cum. 3	10	10	ENE 3	0	0	
At Nyounghla about 11 a. m.; Evening at Koonyway.	23	48,8	47,3	47,9	26,1	29,1	27,2	28,8	29,0	27,0	Cum—s. 8	Cum—s. 9	10	WNW 3	N 4	NNE 2	·° 10—11 a. m., • 1—3 p. m.
	24	48,6	49,0	50,6	24,3	28,5	29,4	28,6	28,8	27,9	Cum—s. 8	10	Cum. 6	ESE 4	SSE 3	SSE 2	·° 4—5 p. m.
On the 25. Noon at Mingyan.	25	51,5	50,4	51,3	29,9	34,0	30,1	27,7	28,8	27,8	Cum—s. 4	Cum. 4	Cum. 3	SE 1	SSE 3	SSE 2	
	26	51,5	49,0	50,2	29,0	33,8	31,5	28,0	28,8	29,0	0	Cum. 5	0	0	SSE 3	SSE 1	⟋₀ in SE.
On the 27. 9 a. m. at Mandelay.	27	50,2	—	49,6	28,6	—	32,8	27,9	—	28,8	Str., Cir. 3	—	Cum. 6	SSE 1	—	SSE 2	⟋ the whole night from NNW to W.
	28	50,9	49,6	50,0	29,2	32,5	29,5	28,1	28,8	28,6	Cir—s., Cum. 7	Cum. 4	Cum—s. 5	SSE 1	NW 2	NNW 2	⟋ the whole night in NW 3—4 a. m. ·².
	29	—	48,6	49,4	—	33,8	27,9	—	28,9	28,0	Cum. 9	Cum. 7	Cum. 6	SSE 3	0	SSE 1	⟋₀ in NW.
	30	50,6	48,6	49,4	29,6	32,0	28,5	27,7	28,6	27,8	Str. 3	Cum. 7	Cum. 7	0	SSE 2	0	
Evening at Shinmagar.	31	50,2	46,6	47,5	29,7	35,3	30,3	27,7	26,8	26,7	Cum. 4	Cum. 2	Str. 2	SSE 1	SSE 3	0	⟋ the whole night in N.
Evening at Thabaikeyn.	June 1	49,0	46,9	46,5	25,5	32,5	25,3	24,1	24,0	23,0	Cum—s. 7	Cum. 6	Cum. 5	E 1	ESE 1	0	≋ from N 2 a. m. with some •
Evening at Tagoungan.	2	47,0	45,9	45,9	24,8	35,5	24,7	22,3	22,5	22,8	10	Cum. 7	Str. 4	NNE 2	SSE 2	0	3 p. m. •, 4 p. m. ≋.
	3	46,7	43,7	43,7	23,3	29,9	26,3	21,8	22,8	22,4	10	Cum. 3	10	SSE 2	SSE 1	0	
Evening at Shoay Koo Gee.	4	44,6	43,4	42,5	26,4	31,4	25,8	21,8	21,8	21,0	Cir—c. 4	Cum—s. 4	0	E 1	SSE 1	SSE 2	
5.—8. June at Bhamo.	5	44,4	40,7	41,5	24,4	37,8	27,4	20,9	25,2	24,0	Cir. 2	Cum. 3	0	E 2	SSE 1	0	Very hot day.
	6	43,0	40,9	42,0	26,7	27,1	25,1	24,8	—	24,8	Cum. 8	Cum. 9	10	0	0	0	5—7 a. m. •; ⟋ in W—N 1 p. m.
	7	43,9	41,4	42,9	23,7	30,0	25,3	24,5	25,0	25,0	10	Str—c. 5	7	0	0	0	·² 5—11 a. m.
	8	43,7	—	43,6	26,4	—	27,0	21,9	—	—	Cir—c. 4	—	10	0	—	NE 2	Rain all night long; ⟋ 9 p. m. in N.
At Kongton.	9	45,0	42,7	45,0	24,7	30,0	27,0	24,9	24,1	23,4	10	Cum. 6	10	NE 1	SW 2	SW 1	⟋₀ in SW at night and • all night.
	10	46,0	44,5	45,4	24,3	29,2	27,1	23,0	25,2	25,4	10	Cum. 5	2	SSE 1	SW 3	SW 1	⟋ in E at night and • till 9 a. m.
Evening at Mandelay.	11	45,4	43,3	44,4	26,5	31,6	28,8	25,3	25,8	26,5	Cum—s. 7	Cir—s. 8	10	SSE 3	ESE 2	SSE 2	⟋ in W.
Evening at Mingyan.	12	44,6	—	43,0	28,0	—	29,0	26,0	—	27,0	Cum. 8	—	10	SSE 2	—	SSE 2	⟋ in E at night. ≏.
	13	46,5	44,7	47,4	27,9	32,3	29,5	27,0	29,0	28,9	Cum. 9	Cum—s. 7	10	SSE 1	SSE 3	SW 2	⟋ in E at night. ≏.
	14	48,5	47,7	49,0	27,4	28,8	28,2	27,4	27,4	27,7	Cum. 10	Cum—s. 9	9	SW 3	SW 4	SW 3	⟋ in E at night.
	15	49,5	47,6	49,0	27,3	35,8	28,7	27,0	27,0	27,7	Cum—s. 8	Cum. 6	10	SW 2	SW 2	SW 2	
	June 16	51,1	—	—	26,0	—	—	27,0	—	—	Cum. 10	—	—	SW 3	—	—	

Rainfall at Ruma 1881—82. (In Millimeters).

	April 1881	May 1881	June 1881	July 1881	August 1881	Septbr. 1881	Octbr. 1881	Novbr. 1881	Decbr. 1881	January 1882	Feb. 1882	March 1882
1	10,5	—	11,0	1,0	0,5	16,3	—	—	—	—	—	—
2	24,2	—	48,8	—	1,3	12,7	—	—	—	—	—	—
3	8,9	—	24,4	3,0	—	14,5	1,0	4,5	—	—	—	—
4	1,0	11,0	50,3	6,6	7,6	2,8	4,3	3,0	—	—	—	—
5	0,8	74,0	21,6	12,2	6,2	—	10,2	—	—	—	—	—
6	—	3,5	12,7	—	4,3	1,0	2,3	—	—	1,3	—	—
7	—	—	4,8	1,0	—	13,2	1,5	—	—	—	—	—
8	—	—	1,3	—	10,2	12,5	6,4	—	—	—	—	—
9	4,0	—	—	14,2	3,3	—	10,2	—	—	—	—	—
10	1,8	—	15,5	16,2	12,7	1,3	5,9	—	—	—	—	—
11	—	3,8	14,0	0,5	10,5	—	—	—	—	—	—	—
12	8,4	3,3	12,0	10,7	1,8	—	—	—	—	—	4,5	—
13	—	—	12,0	—	3,8	2,5	6,4	—	—	—	5,4	—
14	25,4	—	—	—	12,7	0,8	14,7	—	—	—	8,1	—
15	—	—	19,1	11,7	19,1	1,0	20,3	—	—	—	15,7	—
16	1,5	4,5	46,5	19,8	16,7	17,8	7,6	—	—	—	0,5	—
17	12,0	—	61,3	1,8	4,0	16,5	5,1	—	—	—	—	—
18	—	9,9	54,3	2,8	—	6,4	12,7	—	—	—	2,0	—
19	10,7	29,2	42,4	7,9	1,0	18,8	3,8	—	—	—	—	—
20	1,0	1,8	3,3	11,7	19,1	13,2	—	—	—	—	—	—
21	—	—	9,1	13,2	2,5	32,5	—	—	—	—	—	—
22	—	15,7	18,8	9,2	—	5,4	—	—	—	—	—	—
23	—	—	39,1	3,8	12,7	1,3	—	—	—	—	—	—
24	—	4,3	71,9	6,4	7,6	—	—	—	—	—	—	—
25	—	—	—	8,6	1,8	—	—	—	—	—	—	3,5
26	—	7,6	0,8	165,4	—	36,9	—	—	—	—	—	4,0
27	—	3,5	—	255,0	6,4	—	—	—	—	—	—	6,4
28	—	1,3	—	146,1	8,6	—	—	—	1,5	—	—	—
29	—	—	0,5	49,3	1,5	1,3	—	—	4,0	—	—	—
30	—	22,1	—	13,2	18,8	4,0	—	—	1,0	—	—	—
31	—	37,9	—	26,4	12,7	—	—	—	6,5	1,3	36,2	13,9
Total	110,2	233,2	595,5	817,6	207,3	232,9	112,4	7,5				

Total for year 2374,5. Maximum in 24h 255,0 mm on 27. July 1881.

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